THE AMERICAN GAS LIGHT JOURNAL

PUBLISHED WEEKLY, AT NO. 42 PINE STREET.

VOLUME XCVII., No. 4.
Whole No. 1,937.

NEW YORK, MONDAY, JULY 22, 1912.

Subscription, $3 Per Year.
$4 Canada, $5 Foreign.

INDEX TO CONTENTS, PAGE 49. . . . . ADVERTISERS' INDEX, PAGE 22.

LIBRARY OF CONGRESS
JUL 22 1912
SMITHSONIAN DEPOSIT.

Riter-Conley Manufacturing Company

STEEL CONSTRUCTION

Pittsburgh

FUEL!

Are you using high-grade coke worth $4.00 to $5.00 per net ton in your Producers?

We build Gas Oven Plants with Producers using as fuel coke breeze or cheap slack coal worth not over $2.00 per net ton.

Is this difference worth considering?

Analysis of Producer Fuel used for our Vienna Gas Ovens.

CO_2	2.73	per cent.
O_2	0.07	"
CO	28.25	"
H_2	8.10	"
N_2	60.85	"

See our Brochures Nos. 3 and 4.

LEOPOLDAU, VIENNA—72 KOPPERS REGENERATIVE GAS OVENS—PRODUCER HOUSE.

H. KOPPERS COMPANY,

CONSTRUCTORS OF HORIZONTAL CROSS-REGENERATIVE COKE AND GAS OVENS,

5 S. Wabash Avenue, - - - CHICAGO, ILLINOIS.

THE AMERICAN
GAS LIGHT JOURNAL

VOL. XCVII., No. 4. **NEW YORK, JULY 22, 1912.** WHOLE NO. 1,937.

CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

Romance of Britain's Greatest Gas Lighting Business, by Mr. Thos. Reece..... 49

Proceedings, Eighth Annual Meeting, Illinois Gas Association—Concluded from Page 42..... 50

Third Day, Morning Session—Discussing the Schnerr Paper—The Application of Chemcal Control to the Operation of Water Gas Plants, by Mr. G. W. Wallace—Votes of Thanks—Adjourned.

Proceedings, Fourth Annual Meeting, Southern Gas Association—Continued from Page 45..... 55

Second Day, Afternoon Session—Resuming the Discussion on the Leech Paper.

EDITORIALS—

Briefly Told..... 56

July Outing, Society of Gas Lighting—Text of the Rules for the Regulation of Gas, Electric and Water Service, State of Washington—Current Mention.

Publications..... 57

MANAGEMENT AND COMMERCIAL METHODS..... 61

Travelling Gas Exhibition in Germany—*The Offices and Showrooms, Municipal Gas Company, Rome, Ga.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 61

Atlas Paint Enjoys Repeat Orders—Taking Over the Freeport (Ills.) Gas Properties—Betterments at Bath, N. Y.—Mr. Schacklette Gets Control—Presentation to Mr. and Mrs. A. M. Barnes—Proposed Extensions, North Charlotte (Mich.) Gas Company—Riverside, R. I., to Have Gas—The Public Service Corporation Sustained, North Hempstead, N. Y.—Something from Oberlin, O.—Sale of the Hamilton (O.) Gas Plant—Personal—General Gas and Electric Company, Portland, Me.—Annual Meeting, Mechanicsville, N. Y.—Proposed Gas Plant for Hackettstown, N. J.—The Score was 14 to 4—New Selling Schedule, Atlanta, Ga.—Mr. Odell is at it Again—And Other Items.

Public Lighting Table for July, 1912..... 63

The Market for Gas Securities..... 64

Meeting Times of the Various Gas Associations..... 64

Romance of Britain's Greatest Gas Lighting Business.

[Contributed by MR. THOMAS REECE.]

Murdock, a friend of Stephenson and Watts, of locomotive and steam engine fame, was the first man to use coal gas for lighting in England. This was in the year 1792. The industry for the next 20 years had a great fight for life, especially against ignorance. Even Sir Walter Scott, the famous novelist, laughed at the idea of "Lighting London with smoke." Eventually, however, the new illuminant won, and in 1812 the Gas Light and Coke Company, of London, was established. This Company celebrated its centenary with a great festival, June 26, and some little account of its century's progress may not be without interest to American gas lighting engineers.

The old Chartered Company, the parent of the present undertaking, was the only gas company which had the distinction of being established by Royal Charter, and it had its origin in a "Very numerous and respectable meeting" in 1807, held at the "Crown and Anchor," Strand, at which "A duke, a viscount, a baron, a baronet and two knights," it is recorded, were present, and $100,000 was subscribed for the purpose of lighting Pall Mall with the new illuminant, by way of demonstration, and for obtaining a charter. It is a curious fact that Pall Mall was the first street lighted by gas, and that at the present time modern high pressure gas lighting again reigns there, in place of electricity, deposed.

From the small beginning has grown up the present gigantic enterprise, with its $145,000,000 of capital. In fact, one has to think in millions all-round to grasp the extent of the work of the Company. The figures for the year 1911 show that 1,816,962 tons of coal were carbonized by it; that upwards of 13,000,000 gallons of oil were used for making water gas, and that just about 25,485 million cubic feet of gas were sold within the area served of 125 square miles. The The revenue of the Company amounted to upwards of $17,500,000 within the year, and some idea of the popularity of the automatic meter may be gained from the fact that the number of pennies (2 cents) collected from the meters during 1911 amounted to 231,636,536 or 1,993 tons weight of bronze. Besides supplying a domestic want, the half-million gas stoves supplied by the Company are helping to keep pure the atmosphere of the metropolis; and, no doubt, the lessening in recent years of the black, sooty fogs, once so familiar in London, is considerably due to the displacement of the coal fire by gas.

A Masterly Policy.—To the modern consumer the price of gas in the early days of the undertaking—$3.75 per 1,000 cubic feet—would seem incredible as compared with the price charged by the Company in recent years, which has ranged from 70 cents per 1,000 cubic feet, in 1907, to 60 cents at the present time. Public dissatisfaction on the question of price and the irritation caused by the exactions of many of the competing companies forced the question of amalgamation to the front, about the middle of the last century. Nothing practical, however, was done until the advent of John Orwell Phillips as Secretary, in 1862. Under his masterly sway the policy of consolidation was achieved which, continued up to the present day, has conduced to the lasting advantage of the Company and the consumer, and incidentally raised the Gas Light and Coke Company from the position of a second-rate undertaking to that of the first and largest gas enterprise in the world, while its capital has increased ten-fold. In the seventies came the absorption of no fewer than seven other companies: The City of London, Great Central, Equitable, Victoria Docks', Western, Imperial, and the Independent. A little later (1883) the London Gas Light Company threw their lot with the now rapidly growing undertaking, and the West Ham, Barking and Chigwell Companies have within the last few years added to the aggregate of capital and enterprise represented by the present Company.

One important result of the amalgamations was the erection of extensive gas works at Beckton and the closing of several smaller ones in Central London. Among these was the Blackfriars' station, the the site of which included the whole of the area from De Keyser's Royal Hotel to the Temple Gardens. This valuable site—exempt from rating under an old grant—now covered by John Carpenter street, Carmelite street and Temple avenue, was sold to the Corporation of London for the moderate sum of $850,000.

Of the famous Beckton gas works, perhaps the largest and most complete in the world, a wondrous story might be told did space permit. Nine giant gas holders rise black against the sky, around them are grouped workshops covering 350 acres of ground, while the hungry retorts, swallowing hundreds of tons of coal day and night, are fed from the steam colliers of 2,000 to 4,000 tonnage, which are constantly adding to the enormous stacks of coal in which at times are nearly 200,000 tons ready for translation.

The Great Mains.—Forty miles of railway runs through the works, carrying hither and thither not only the coal, but the by-products, the manufacture of which constitutes a valuable and extensive business in itself. From 30 to 50 millions cubic feet of gas are daily poured into London from Beckton through huge mains, some of it

being transmitted under high pressure, a novelty in which the Company have been pioneers.

The Gas Light and Coke Company has been fortunate in the able men who has directed its affairs. Under the 31 years of Mr. Phillip's guidance the Company rose to the first rank among gas enterprises; under the rules of the present governor (Mr. Corbet Woodall) not only has the prosperity of the undertaking risen by leaps and bounds, but the position of its 9,000 employees has been greatly improved.

The first great service that Mr. Corbet Woodall did for the Gas Light and Coke Company was to bring about a revolution in their policy towards the public by the establishment of a sales department. His object in doing this was not only to push the sales of gas by advertising, canvassing, and other legitimate methods, but to get away from the "monopoly" idea, and to establish good relations with the public by giving good service which is the foundation of permanent success in business. In carrying out this policy he was ably seconded by Mr. F. W. Goodenough, who was put in charge of the department as controller of gas sales. As to the soundness of the policy thus inaugurated there can be no question, for never did better relations exist between a gas company and its consumers. As has already been pointed out, by the active pushing of the sale of gas for heating in London, thanks to the forward policy inaugurated by Mr. Woodall, much has been done both to mitigate the smoke nuisance and to solve the servant difficulty; in other words, the Company has helped forward the national health movement in more ways than one.

Gas vs. Electricity—By the system of co-partnership to which they have been admitted, every worker in the employ of the Company has a direct interest in the efficient discharge of his duties because the increased prosperity of the Company means a larger bonus to himself. An attitude of absolute neutrality is observed towards all workers, whether union or non-union, who efficiently fulfill their contracts, and opportunities are afforded to the men to qualify for higher posts by the provision of lectures and instructions in the science, mechanism, and finances of all that concerns their calling. To Mr. Corbet Woodall also must be attributed the inauguration of a most successful scheme in which apprentices are taught all the practical details of gas fitting.

Under the able guidance of the long line of capable men who have made the prosperity of the Company possible, and to whom Messrs. Corbet Woodall, D. Milne Watson and F. W. Goodenough are worthy successors, it has triumphed over many difficulties in the past 100 years, and not the least of these has been the rivalry of the electric light. But the incandescent mantle came to the aid of gas in the very nick of time, and with the use of this new weapon of defence largely increasing the light-giving power of gas, the automatic meter which has rendered the use of gas possible to the poor, the constantly increasing demand for gas stoves for heating and cooking, improved methods of carbonization, and the growing revenue from residuals, gas enterprise can easily hold the field against the competition of electricity, and under the expert and able guidance of its excellent executive staff the Gas Light and Coke Company may confidently expect not only to maintain its present prosperity but to climb to fresh heights of success.

[Concluded from page 42.]

PROCEEDINGS OF THE EIGHTH ANNUAL MEETING, ILLINOIS GAS ASSOCIATION.

Held in the Auditorium Hotel, Chicago, March 20 and 21, 1912.

Third Day—Morning Session.

Discussion on the Schnerr Paper, for the text of which see ante, p. 42.

The President—This excellent paper on a very interesting subject is before you for discussion, and I hope that while he was reading it several have been preparing questions or remarks for the debate. Mr. Heath, have you anything to say on this subject?

Mr. C. E. Heath—I would like to say, having read the paper carefully, I believe the matter is well worth an experimental trial in a practical plant. I think Mr. Schnerr covered the ground in ample way and with the result that this interesting and important subject is put squarely before us for consideration. Regarding the practical test at the East Hull gas plant in England. Reading an article upon the work being done there, I noticed one statement not brought out in this paper and, as it concerns an interesting phase, I would like to have the point cleared up by Mr. Schnerr for my own satisfaction and that of others. The point is that the sulphur dioxide as he used it is first passed into a washer for purifying, the excess passing into a still. As these gases, which may or may not be noxious gases, then pass into the atmosphere, I would ask whether they may contain an excess of sulphur dioxide, which fact would be disadvantageous to the use of the process in localities where the emissions would be obnoxious to the residents in the vicinity of the gas plant. In such event the process would cause considerable objection in communities such as ours, or where the works are located within the corporate limits of the town. The author speaks of attention being required by skilled labor. It looks that his point is well taken, for we will need skilled labor to take care of this process, but I believe he has unduly emphasized that point; in fact, this requirement may be exaggerated in the minds of some of our practical members, that they would deem this necessity an objection to the process. I believe if the process were practically worked out sufficiently simple methods of determining the per centage of sulphur dioxide could be devised and tables made up, so that any man of ordinary intelligence, or without any previous schooling or preparation in conducting these tests, with the supervision and advice of the assistant superintendent or a man of equal intelligence, could capably operate this purification system. thereby lowering the heavy charge owing to the employment of skilled labor in this plant. We all know that labor costs are the high costs in plant operation, and if skilled labor could be reduced it would materially reduce the cost of this process. I further believe that sulphur could be purified to a greater extent than Mr. Schnerr has mentioned by the simple process of fusion or melting. They use the process in Louisiana to remove sulphur from the depths of the earth by drilling holes and filling these with superheated steam, melting the sulphur from a depth of 1,000 feet or more, forcing the molten sulphur out to the surface through pipes by means of compressed air. My suggestion would be this. As long as we have this sulphur burner already a part of the process, in order to produce the sulphur dioxide, the excess heat from this burner, possibly from the top of the burner, could be utilized as a means of remelting this sulphur. The greater proportion of tar that might be in the sulphur should be removed by proper scrubbing of the gas before it enters the purifiers. Then the sulphur could more readily be purified by re melting without using any extra heat, just utilizing the heat that you already have in the process. The purification could be brought to a very high degree, I believe, by cooling the molten sulphur very slowly. I believe this is true, for we know that in the slow process of cooling and solidification of liquid compounds the impurities, as a rule, remain in the liquid and are removed from the solid, which can be illustrated in a practical sort of a way by saying that there are two methods of crystallizing water; that is, in making artificial ice. One is the process of can ice, in which the water ha s to be distilled because all of the water in the can is solidified, but in the process of plate ice they can use any kind of water, be it river water or other muddy water. It does not need to be distilled, because the water is slowly cooled, solidifying gradually, on a plate some 30 or 40 feet square. In the process of solidification every impurity in the water remains, and the ice comes out as clear as crystal from that process, as you may know. Another point Mr. Schnerr mentioned has to do with the depreciation of the plant. He states in one place it might be 10 per cent., but I think 10 per cent. would be a low figure for depreciation, because of the acid nature of the purifying agents. The depreciation of the fans and other metallic parts, scrubbers and washers might be a little higher, say 20 to 30 per cent., but that would be a matter for further consideration. On the whole, I think Mr. Schnerr has presented to the Association a very able paper.

The President—Has Mr. Harper anything to say on this question?

Mr. Harper—I think all, upon hearing the paper for the first time, are inclined to be pessimistic. It reminds me of the story of a Scot named McKenzie, who, on being asked if he thought there was an honest man in the world, said he knew of only two, "Sandy and meself, but 'e 'ad 'is doots about Sandy." [Laughter.] We may feel this way about this process, but I think Mr. Schnerr had brought out something which should receive from them all deep consideration. For that which would conserve waste in the manufacture of gas was something well worth consideration, and although the author had shown them a process that appeared practical and that paid for itself, I think he has been very modest in his estimates. He has, for instance, stated that the sulphur ought to sell for at least $20 per ton. Good sulphur, 98 per cent., usually goes for about $40 a ton. He has certainly given a very modest figure, and no doubt there would be a profit with a low depreciation. As to depreciation, as Mr. Heath

pointed out, that might be over a reasonable amount—I intended to bring out that point, but Mr. Heath has covered it very thoroughly. I would like to ask Mr. Schnerr, however, if he thinks that the washers that are now on the market would be ample to take care of this process without serious deterioration? There are a few other questions I would like to ask him, for instance, if he determined the nature of the ash in the sulphur. I do not know the source of this. It may be that it is iron that has been corroded, or some other mineral matter. If you have made any attempt to discover the nature of the ash, I should like to know it. Mr. Heath also brought out a point that I was going to cover, namely, the purification of the sulphur. It seems to me his suggestion is a very good one, that by effusion we should get a very highly purified product, and in that way greatly add to any profit that might accrue from such a process. There is a minor error (I believe of the printer's) at the bottom of page 21, where it is stated, "Table D is an illustration of varying liquor." I believe you meant, if I am not mistaken, the temperature of the liquor; is that not so, Mr. Schnerr?

Mr. Schnerr—The varying liquor and gas temperature.

Mr. Harper—I did not know whether you meant the strength was varied, or the temperature; but I now see the strength is given here. Concerning the question of possible profit to the gas industry by the saving of sulphur, in looking up the imports and exports of that material for the year 1910 I found that the home production in that year was about 300,000 long tons, and that our imports were approximately 28,000 tons, and that our exports were 30,000 tons. This shows the great demand for sulphur in this country, and it looks a great thing for the gas industry in the future to be producing sulphur here in America. It certainly is a sort of reflection on our industry that we do not make greater use of our waste than we do. Usually we look to Germany for that sort of conservation, perhaps rightly so. Driven by necessity they have gone into the matter more thoroughly than we have, and I hope some day we may come to that high state of efficiency that they say the meat packers have, of realizing on everything but the squeal. On the whole Mr. Schnerr gives us food for thought, and I hope some day to see this process worked out. Though problems will naturally arise by the solvent of such a process, I look to see them overcome, and it may be that our pessimists will then be converted into optimists,

The President—Mr. Hartman, have you anything to say on this subject?

Mr. Hartman—I am interested in this paper and I feel it has been treated very ably. I would ask Mr. Schnerr, in regard to the Feld purification process, which I understand is in use at the East Hull plant, if he knows whether or not it is giving satisfaction, and whether or not it is now on the market by the Construction Company? I would ask him further whether or not any of the liquid purification processes thoroughly clean the sulphur. Foreign experience shows they always require solid purifiers and have to follow this purification system with an ordinary oxide purifier to remove the last traces of hydrogen sulphide. As much as 20 or 25 per cent. of the hydrogen sulphide remains in the gas. And I would also ask him if in his experimental work he used anything other than glassware; in other words, has he used steel or wrought iron, and, if so, what corrosive action there was? Again, what was the effect of the carbon dioxide? Whether it affected the efficiency of the process.

The President—Any other discussion? If not, I will ask Mr. Schnerr to close the discussion.

Mr. Schnerr—I will endeavor to reply to questions *seriatim* in attempting to answer their questions. Mr. Heath inquired about the escape of SO_2 in a process of this sort. In the English installation the SO_2 was absorbed in the still. There is no escape in any apparatus of this sort. The question of skilled labor might be exaggerated, perhaps. How many of the gentlemen here, intelligent gas men one and all, would feel like taking up a process of this sort to-morrow and going into their gas plant and installing the operation; who would even feel like taking the time to learn the details of this process before caring to take it upon their hands? Even the men that you have about your works, intelligent foremen probably, are not qualified to carry on a liquid purification plant unless especially trained in that line. They are not accustomed to handling chemicals, and are not versed in them; neither are they versed in chemical reactions, so are not prompt to handle something of which they are timorous. We might, as suggested, obtain sulphur containing a certain percentage of tarry organic matters, and a small percentage of ash, which I did not analyze, but the sulphur itself cannot be purified by fusing. I have worked on that problem for a year, I have tried fusing for the separation of the tar and sulphur, and found it was impossible; after you have them fused they remain together. You might think that, inasmuch as one of these elements is very light, naturally they would separate, but fusion will not touch them nor will solution affect them. I thought there might be a differential of oxidation that would carry one off and thus separate them, but I found only a very small amount of sulphur left after the experiment. Ten per cent. may be low depreciation for the use of the process, but the depreciation would be mainly in your pump, and you might have your washers deteriorate, but I think that 10 per cent. of the investment will probably cover all deterioration traceable in the washers and the pumps. Mr. Harper speaks of conservation. This is one of the finest expressions I have heard here since the meeting started—conservation of the resources of the gas industry. There is something every gas man must follow out from now on to the end of the gas business. In the early days the American people welcomed us, and we were receiving large prices per 1,000 feet; there was very little competition; the electric industry was in its infancy. But at the present time they are cutting down these selling prices of gas, they are competing electrically in every city in the United States, so the gas men must study conservation. Mr. Harper asks if our present washers are suited to the purpose. That question I cannot answer for I did not use either one of these suggested washers on the process. I simply looked at the type. I consider that as a matter of washing out H_2S; that if the present washers will not handle it some type of washer shall be devised that will. As to the need of liquid purification, I believe it was suggested that the European systems took the H_2S down to 25 per cent.; 25 per cent. impurity in the gas is pretty large. We might run 115 grains of H_2S for 100 cubic feet of gas, and if we cannot get that down to 3 grains per 100 cubic feet, I think my equipment is pretty poor. As far as my experimental work was carried, I did not find any effect caused by carbon dioxide. The only thing that I have mentioned before is the fact that in higher crude gas we would find hydrogen sulphide would naturally come out with the CO_2, what we call the acid. [Applause.]

The President—We are very grateful to you, Mr. Schnerr, and your excellent paper has certainly brought out some very fine discussion. It will form an excellent part of our Proceedings. The paper by Mr. G. W. Wallace, on the

THE APPLICATION OF CHEMICAL CONTROL TO THE OPERATION OF WATER GAS PLANTS

was listed as next for our consideration. We, however, received word this morning that the author could not attend the meeting. The paper will not be read, but will be incorporated in our report.

This paper will consist of data secured from the analyses of gases from carbureted water gas machines, extending over a period of 4 years, in the operation of 3 different gas plants, and the data obtained used as a means of arriving at a proper way to control the operation of water gas apparatus.

The analysis of the various gases from a water gas set gives positive information as to what the machine is doing, and a lead as to what is necessary to intelligently remedy any of the inefficiencies in its operation. It is not always possible to secure conditions for the economical operation of a water gas set, because of inefficient boiler system, blower plant, or other causes, but a systematic analysis of all conditions will yield good results.

It is possible during operation to secure 60 different samples of gas from one complete run and blow. Each sample has a certain value, and the first problem that confronts the engineer or chemist is to determine which of these 60 samples he needs to secure the information he is seeking, with the least possible work.

The second problem he encounters is how to tell, from the samples he has chosen, whether his analysis represents efficiency or inefficiency. It is safe to say that the majority of gas engineers and chemists use the gas analysis as a check on the quality of the gas, but do not attempt to apply it to locate the cause of trouble, if the quality suddenly drops. When the candle power drops, the attempted solution is usually more oil, and at the time it is very probable that the machine is then overloaded with oil. There is for every temperature condition in a water gas set a certain definite amount of oil that the machine will take care of and convert into gas efficiently. Above this amount the proportion going into gas drops off rapidly producing a corresponding increase in cost of manufacture. This being true, it is a waste of time and money in trying to correct the inefficiency of the generator or superheater by deluging the carburetor with oil. What is true of too much oil is also true of too little. When

not enough oil is being used to properly enrich the blue gas and utilize the heat in the carburetor and superheater, a large percentage of the oil is decomposed beyond the hydrocarbon point, forming lamp black and hydrogen. One way of checking this condition is to calculate the percentage of blue gas in the finished gas, and such calculation will be taken up later.

From the results obtained during several years of operation on five machines the per centage of blue gas in the finished gas was between 72 per cent. and 76 per cent. How very little it changes the make in juggling the oil so the percentage of oil gas varies 2 per cent. This being true, it must also be true that there is something far more important than a mere difference of a fraction of a gallon of oil from the normal, that changes and governs the make and quality of the gas.

Another problem is to determine what causes the various changes in the action of a water gas set. Some of these are well known and are otfen experienced; namely, stoppages due to formation and deposition of carbon and ash, formation of a film of insulating substances on the firebrick, spray trouble, which usually is easily remedied. An illustration of what could have been a serious form of spray trouble might be of interest.

On a carburetor which had been giving good results with the spray nozzle properly adjusted and kept clean, it became necessary to recheckerer. After recheckering black spots developed. On investigation it was discovered that the brick had been carried 2 tiers higher than before, and this caused the oil to be distributed unevenly. On removal of the two extra tiers of brick the conditions again became normal.

Inability to burn the coke in the generator is a condition often encountered and hard to deal with. One of the objects of this paper will be to apply the analyses of the various gases to show the cause for these conditions, and by the analytical data secure a definite series of formulæ that will answer the investigator in relative figures. A series of curves forming part of this paper furnish analytical data on the composition of every gas that can be secured from a water gas set, under several variable conditions. The samples were secured periodically at various points on the machine and the data plotted. There were 4 complete tests made. Each test covered a week's work, the samples being taken one day, the rest of the week being spent in watching results. Series of runs and blows were sampled every minute, at the top generator and top superheater, for one hour, which included the usual down runs and generator charging. Three sets of samples were taken; one shortly after clinkering, ¼ way between periods of clinkers and one shortly before the next clinker. The machine was allowed to make directly into a small holder, and minute readings were made during the test run, to determiue the make. The oil, coke, ash, etc., were carfully kept track of.

Temperature readings were made at the center of the generator, center of the carburetor and top of the superheater, each minute between clinkers and each ¼ minute during test runs. From the data thus secured the plates[1] herewith submitted are prepared.

Plate No. 1 represents the blow preceding test No. 1. In plate No. 2 notice the CO_2 in the generator shows that the fire conditions are not right; the fire not being hot enough to cause the following reaction to predominate:

$$CO_2 + C = 2\,CO$$

The carbon at the bottom of the generator is, or should be, burned to CO_2. The CO_2 passes up through the incandescent carbon, reacting with it, taking up carbon forming CO. This CO will be burned in the carburetor if the conditions are right. From these plates it is possible to calculate exactly what is happening in the machine, but further reference will be made in another part of this paper.

In this case: (Plate No. 1) 56.4 per cent. of the fuel used in blasting was completely consumed in the generator; 29.1 per cent. was used in heating the carburetor and superheater; while 14.5 was burned outside the machine.

These figures represent what is customarily called good operation. They were taken from an 11-foot 6 Lowe type water gas machine, under the ordinary working conditions. The morning of the test the operator was asked his opinion as to the condition of the apparatus and passed it as "O. K."

Calculating from the analysis of the gas, we find that only 33 per cent. of the generator fuel is used for gas making, while 67 per cent. is used for blasting. Of this, 21.5 per cent. goes out the stack as combustible gases. This denotes inefficiency. In actual weight that amounts to over 1 ton of coke. The coke on this day was 33.3 lbs. per 1,000. Taking out the loss, due to combustion occurring outside the machine, but not including the excessive amount of coke used in blasting, the coke per 1,000 would be 27.6 lbs.

Plate No. 2 gives an accurate curve of practically every item of analytical data possible to secure during a run. There are four of these tests in which the temperature of the generator was made the variable. All other conditions were kept as nearly constant as possible. At the top of each plate there is a summary of the temperatures, raw materials used, make, quality, etc.

The first test represents the lowest temperature, the second somewhat higher, and the fourth the highest. Plates No. 9 and 20 show the gases sampled during the run. Plates No. 21 and 26 show the blast gases. As to the utility of these comparative charts: It is desired to know how the hydrogen in blue gas behaves at different temperatures. By turning to Plate No. 2 will be found the curves numbered 1, 2, 3 and 4; at the top of the page will be found a table of the temperature of the generator corresponding ty the number of the test. Similarly, if it is required to know how the hydrogen in the finished gas was affected, turn to Plate No. 12. In this manner the density, make and B.T.U., as well as each constituent, have been comparatively plotted.

Plate No. 4 shows the second test run. Notice the carburetor temperature is lower, generator temperature higher, make greater, oil per 1,000 lower, and quality of gas better. Turning to Plate No. 19 it will be noticed that the B.T.U.'s are higher.

Plate No. 5 shows the blow preceding test No. 3, Plate No. 6. The temperature of the generator is much higher. There is improvement in the distribution of combustion, with reference to the amount of fuel used in the generator for blasting. The percentage of CO_2 and CO in the superheater is the basis of an interesting calculation, showing that 23 per cent. of the blasting fuel is being burned outside of the machine.

Plate No. 6 shows the data secured during test No. 3. Other than the higher temperature in the generator, there is not much change in the rest of the machine, still there is an increase in the make and quality, with a consequent drop in the cost per 1,000.

Plates Nos. 7 and 8 show a fourth test made. This test was made using an excessively high temperature; one not at all practical. This test is of interest, inasmuch as it shows, as did the others, that the cost of manufacture is in a measure dependent on the generator temperature.

On Plate No. 25 the difference between the CO_2 in the generator blast gases at low and high temperature is shown. This data has been carefully prepared, is representative of the different conditions noted, and is submitted for references and further study.

It would be difficult for anyone not familiar with the chemistry of gas manufacture to pick, from the analyses submitted, those which are most necessary for proper control in the operation of water gas apparatus, and for everyday use the needed information must be secured with as few operations as possible. It will be found that a daily analysis of the finished gas is very useful in determining the quality of the gas sent out. When trouble occurs, attention should be given at once to the generator condition. Secure a sample of blue gas taken each minute during run. In the same manner secure samples of the blast gases from the generator and superheater. Examine these samples only for carbon dioxide, oxygen, carbon monoxide, in the blue gas for hydrogen, and the work can be accomplished in a short time. The amount of information that can be secured from these few carefully prepared analyses is astonishing. All but 3 sets of analyses have been eliminated; one blue gas and two blast gases.

It is evident that unless the exact way in which the fuel that has been used in the generator is known, we cannot understand why, if the percentage of CO_2 is high or low. Take, for instance, Plate No. 25, with all the temperature given it would be hard to locate the cause of the excessive amounts of CO_2 in the generator. In fact, unless there was a gas analysis at hand there would be nothing to indicate that the CO_2 was high, for, as Plate No. 1 shows, the temperatures are normal and do not indicate that there is any loss. The oil and coke being high show this loss, and the gas analysis gives a means of calculating the exact point at which the loss is taking place. Therefore, it is believed that the data thus secured must be reduced to a definite standard, which will represent the prevailing conditions.

Continuing the comparison, the oil shown on Plate No. 1 is high. The conclusion might be, without definite knowledge to the contrary, that the temperature of the carburetor was low, but raising the temperature on a guess may be the cause of having to recheckerer the

1. The plates (36 in number) may be obtained by applying to the Secretary of the Association.—Ed.

machine in a short time because of the formation of excessive lampblack. It would be possible to enumerate numberless nearly right conditions, that to guess at the remedy would be dangerous to economical operation.

The following is a calculation of the distribution of fuel consumption in a carbureted water gas set, the purpose of which has been shown.

Analysis of Blast Gases by Volume.

	Generator.	Carburetor.	Superheater.
CO_2	10.2	15.5	19.1
Oxygen	0.8	0.2	0.3
CO	15.0	6.3	0.5
Nitrogen by diff	74.0	78.0	80.1

The percentage by weight is accomplished by multiplying each constituent by its specific gravity. The sum of these products gives the weight of the gas, and, when divided by 100, the specific gravity. By dividing the weight of each component part by the weight of the whole, the percentage by weight is secured. In the case of the generator gas we have:

CO_2..	10.2 × 1.529 sp. gr.	=	15.55 ÷ 112.23 = 13.7	per cent. by wght.
O....	9.8 × 1.105 "	=	0.88 ÷ 112.23 = 0.8	" "
CO..	15.0 × 0.97 "	=	14.50 ÷ 112.23 = 12.7	" "
N....	74.0 × 1.1 "	=	81.40 ÷ 112.23 = 72.8	" "
			112.23	

Analysis of Blast Gases, Percentage by Weight.

	Generator.	Carburetor.	Superheater.
CO_2	13.7	20.4	24.8
O	0.8	0.2	0.3
CO	12.7	5.2	0.4
N	72.8	74.2	74.5

Analysis of Blue Gas.

	By Volume.		Sp. Gr. Wght.	Percentage by Wght.
CO_2....	3.0 × 1.529	=	4.6 ÷ 54.9 =	8.5
O.....	0.6 × 1.105	=	0.7 ÷ 54.9 =	1.3
CO	41.7 × 0.97	=	40.5 ÷ 54.9 =	73.6
CH_4....	1.9 × 0.57	=	1.1 ÷ 54.9 =	2.0
H.....	48.6 × 0.0695	=	3.4 ÷ 54.9 =	6.2
N.....	4.2 × 1.1	=	4.6 ÷ 54.9 =	8.4
			54.9	

Analysis of Finished Gas.

CO.	Ill.	O.	CO.	CH_4.	H.	N.
2.2.....	10.2	0.2	30.0	17.5	33.7	6.2

Since oil gas contains practically no CO from the gasifying of the oil, and at most never more than 1 to 2 per cent., the following calculation can be used with reasonable certainty:

Per cent. CO in blue gas: Per cent. in finished gas::100: X. Therefore, the finished gas is 72 per cent. blue gas.

DISTRIBUTION OF COMBUSTION GENERATOR.

Percentage of carbon in CO_2 = 27.27
Percentage of carbon in CO = 42.80
Heat of combustion, carbon to CO_2 = 80,833 calories.
Heat of combustion, carbon to CO = 24,166 calories.

Using the analysis of generator blast gases; percentage by weight:

CO_2.. 13.7 per cent multiplied by percentage carbon in CO_2 (27.27 per cent.) = ... 3.73 per cent.
CO.. 12.7 per cent. multiplied by percentage carbon in CO (42.80 per cent.) = ... 5.43 per cent.
9.16 per cent.

The sum is the total carbon in these gases (9.16).

$$\frac{3.73 \times 80{,}833 + 5.43 \times 24{,}166}{9.16 \times 80{,}833} = 59.2 \text{ pr. ct. combustion in generator.}$$

The carbon in the CO_2 having been burned completely has given off all of its heat. Therefore, it is multiplied by its total heat of combustion. The carbon in the CO has not been burned completely; therefore, it has not given off its total heat of combustion. It is multiplied by the heat of combustion of carbon to CO. If the sum of these two be divided by the product of the total carbon in the gas, and the heat of combustion of the carbon to CO_2, the result is the percentage of the total possible combustion that has taken place, at the point where the samples of gas were taken.

Combustion in Generator and Carburetor.

CO_2. ...	20.4 per cent. ×	27.27 per cent.	= 5.56 per cent.
CO.....	5.2 " ×	42.80 "	= 2.22 "
			7.78 "

$$\frac{5.56 \times 80{,}833 \div 2.22 \times 24{,}166}{7.78 \times 80{,}833} = 80 \text{ per cent.}$$

Combustion in Generator, Carburetor and Superheater.

CO_2.....	24.8 per cent. ×	27.27 per cent.	= 6.76 per cent.
CO.....	0.4 " ×	42.80 "	= 0.17 "
			6.93 "

$$\frac{6.76 \times 80{,}833 \div 0.17 \times 24{,}166}{6.93 \times 80{,}833} = 98.7 \text{ per cent.}$$

Combustion Outside Machine.

100 per cent. — 98.7 per cent. = 1.3 per cent.

Summary of Distribution of Combustion.

Blasting generator	59.2 per cent.
" carburetor	20.8 "
" superheater	18.7 "
Outside machine	1.3 "

Distribution of Fuel.—Calculating Carbon in Blue Gas.

CO_2. 8.4 per ct. × 27.27 per ct. = 2.29 per ct.
CO.. 73.5 per ct. × 42.80 per ct. = 31.46 per ct.
33.75 per ct. Total carbon in blue gas.

One cubic foot of air weighs .08069 pound. Multiplying this weight by the specific gravity of the blue gas, shown on page 10 as .55, gives the weight of 1 cubic foot of blue gas, or, in this case, .044379 pound; 1,000 cubic feet weighing 44.379 pounds. This 44.37 pounds of blue gas being 33.75 per cent. carbon, contains 14.95 pounds of that element. As the finished gas is 72 per cent. blue gas, there is in every 1,000 cubic feet of finished gas (14.98 × 72) or 10.8 pounds of carbon taken from the generator fuel.

On the day of this test the coke ran 34.6 pounds per 1,000. Deducting the 10.8 pounds used for gas making, leaves 23.8 pounds to represent that used in the blasting. Dividing the 23.8 pounds of coke used for blasting by the percentage distribution of combustion, gives the following summary for the complete distribution of fuel.

	Per Cent.
Fuel used for gas making 10.8 lbs	31.2
Fuel used blast generator 14.1 lbs	40.8
Fuel used blast carburetor 4.9 lhs	14.2
Fuel used blast superheater 4.5 lbs	13.0
Fuel burned outside machine .3 lbs	.8

The above conditions would indicate that not enough of the coke is going into the gas, too much being used for blasting. The direc cause for this was a slight stoppage in the take-off pipe, allowing a free blast and retarding the exit of the gas. The first time that the distribution of fuel was calculated by the writer was on an occasion when temperature of the carburetor could not be kept high enough. The machine would not take care of the oil and gave considerable trouble. The following data was secured at that time:

Distribution of Combustion:

	Per Cent.
Blasting generator	95.0
Blasting carburetor and superheater	3.8
Outside machine	1.2

Distribution of Fuel:

Gas making	31.8
Blasting generator	64.8
Blasting carburetor and superheater	2.6
Outside machine	.8

This analysis showed what was needed to remedy this condition was to send a little more CO into the carburetor, and this required a little more or less blast. As the blast was 22 inches it was reduced to 18 inches, and when the change had been made the following results were secured with a consequent drop in cost of manufacture.

Distribution of Combustion:

	Per Cent.
Blasting generator	70.5
Blasting carburetor	15.9
Blasting superheater	4.55
Outside machine	9.00

Distribution of Fuel:

	Per Cent.
Gas making	36.4
Blasting generator	44.9
Blasting carburetor	10.1
Blasting superheater	2.9
Outside machine	5.7

On another occasion considerable trouble was encountered in keeping the temperature of the superheater down. On analysis it was found that an equal amount of combustion was taking place in both carburetor and superheater. Since the carburetor receives by far the greater cooling action from the oil, it was soon seen that too much blast was driving the gases through the carburetor without giving them time for proper combustion and the trouble was corrected.

This particular test led to considerable experimenting on the subject of the formation of lampblack. It was the writer's privilege to direct the preparation of carbon filaments for the various types of incandescent lamps. One of the operations was to place the filament in a vessel, drawing a vacuum within ½-inch of the barometer. This vacuum was then relieved by allowing gasoline or hexane vapor to enter the vessel, until the pressure had gone up to 2 inches above a perfect vacuum. The filament was then heated by passing a current of electricity through it, until it was incandescent. This decomposed the hydrocarbon vapor which formed in a thin, hard graphitic coating of carbon on the filament. This coating gives the filament its proper electrical resistance and increases its life.

On one occasion series-tests were made to determine the effect of air on the decomporition of the hydrocarbon It was found that with ¼ of an inch of air pressure a considerable quantity of lampblack was formed. With ½ an inch large quantities of lampblack were formed, depositing on the sides and bottom of the vessel.

With the above in mind, it was noticed several times that, when the oil was started before the blue gas reached and filled the carburetor, considerable quantities of lampblack were seen in the overflow. This was with a comparatively low temperature in the carburetor and superheater. Somewhat the same principle is applied to the manufacture of lampblack commercially. The oil is burned in a reduced atmosphere.

A gas maker can make more lampblack than is advisable, and not know it, and the following calculation has been used advantageously to determine just how much excess lampblack is being formed.

The average percentage of CO in blue gas 45.4 per cent.

The average percentage of CO in finished gas, 32.9 per cent.

32.9 : 45.4 : : 72 : 100.

The finished gas is 72 per cent. blue gas.

The blue gas is 48.9 per cent. hydrogen.

48.9x72=35.4 per cent. of hydrogen in finished gas, due to the blue gas.

Finished gas is 42.9 per cent. hydrogen.

42.9−35.1= 7.8 per cent. of hydrogen in finished gas, due to decomposition of hydrocarbons into carbon and hydrogen.

Multiply this by 1,000 and secure the cubic feet per 1,000 of finished gas, which is 78.

Specific gravity of hydrogen is .0695.

One cubic foot of air weighs .0869 pounds.

.0869 × .0695 = .0056, weight of 1 cubic foot of hydrogen.

.0056 × 78 = .44 pounds of hydrogen per 1,000 cubic feet of finished gas, due to the decomposition of the oil into carbon and hydrogen.

Assuming C_nH_n as the average composition of the illuminants. The illuminants, being unsaturated hydrocarbons, are unstable and very easily decomposed. The following illustrates the nature of this decomposition:

(Methane) CH_4 ....C_nH_n ...$ClOH_4$ (naphthaline)
(Carbon) C .....C_nH_n ....H (hydrogen)

There are innumerable intermediate reactions, but always, if the decompo ition be carried far enough, carbon and hydrogen will be formed.

From the above it is concluded that, for each part of hydrogen formed from the oil, there will be 1 part of carbon formed. In this case there were .11 parts of hydrogen formed. As carbon is 12 times as heavy as hydrogen, there would be .44 × 12 = 5.28 pounds of lamp black formed per 1,000 cubic feet of finished gas.

As both the hydrogen and the lampblack thus formed were derived from the oil, there were 5.28 + .44 = 5.72 pounds of oil used to form 78 cubic feet of hydrogen. The oil in this test ran 4.0 gallons per 1,000. By the application of the above calculation and the use of a few gas analyses, it was cut to 3.4 gallons per 1,000. The data secured for this paper is far too extensive to permit more than a few suggestions, and its purpose is to show that the greater part of inefficient water gas operation is due to improper generator opera tion and that most water gas machine troubles can be traced to and corrected by a change in the operation of the generator.

In Plates Nos. 27 and 28 were tabulated the average of the most important data. It is noticeable that the generator temperature is the only consistent variable; also, as this temperature goes up, the make per run and per hour increase. The oil and coke per 1,000 are lower and at the same time the quality of the gas is better. Therefore, up to a reasonable limit, the temperature of the generator is the controlling factor, with regard to resulting efficiency.

Some time ago it was necessary to burn coke that made a hot fire and no clinker, but forming large quantities of loose ash. The make per hour, right after cleaning fire, was good, but soon drdpped so low that it did not pay to operate machine; 75 per cent. of the combustion was taking place in the generator and only 31 per cent. of the coke was going into the gas. After trying different conditions of blast and steam, the machine was clinkered every 10 hours. The result was a 22 per cent. increase in make per hour for the 24 hours; a 20 per cent. decrease in the coke; a 27 per cent. decrease in the oil; this with an increase of 3 candle power and 10 B. T. U. in the finished gas.

Plate No. 28 carries a tabulation of data secured from 3 different tests on an 11 foot 6 Lowe type water gas machine with varying steam

PLATE NO. 27.—*Temperature of Generator Variable. Tests Made at Station B on Water Gas Generator No. 1.*

	No 1.	No 2.	No. 3.	No. 4.
Temp. top of generator	920° C.	997° C.	1,101° C.	1,193° C.
Temp. center of carburetor	669° C.	566° C.	730° C.	680° C.
Temp. center of superheater	486° C.	591° C.	480° C.	543° C.
Blast	18.25 in.	17.75 in.	18 in.	18.5 in.
Steam, pounds per square inch	30 pounds.	30 pounds.	30 pounds.	30 pounds.
Oil per minute	10.83 gals.	10.83 gals.	10.83 gals.	10.83 gals.
Oil per 1,000 cubic feet	3.90 gals.	3.45 gals.	3.35 gals.	3.30 gals.
Length of run	6 min.	6 min.	6 min.	6 min.
Length of blow	5 min.	5 min.	5 min.	5 min.
Average candle power	19.70	21.10	21.40	21.30
Average B.T.U.'s	560	610	620	650
Make per run	17,000 cubic feet.	18,823 cubic feet.	18,950 cubic feet.	19,910 cubic feet.
Make per minute	2,834 cubic feet.	3,137 cubic feet.	3,160 cubic feet.	3,318 cubic feet.
CO_2 in blue gas (per cent. by weight)	15.40 per cent.	15.10 per cent.	11.90 per cent.	7 per cent.
CO in blue gas	68.00 per cent.	70.30 per cent.	71.70 per cent.	72 per cent.
Temp. of gen. during blow	890° C. to 980° C.	940° C. to 1,021° C.	1,065° C. to 1,127° C.	980° C. to 1,235° C.
Temp. of carb. during blow	631° C. to 825° C.	580° C. to 740° C.	566° C. to 853° C.	593° C. to 805° C.
Temp. of superheater during blow	488° C. to 490° C.	582° C. to 590° C.	480° C. to 482° C.	530° C. to 512° C.
Make per day	820 M.	1,022 M.	1,046 M.	1,103 M.
Coke	27,370	25,370	34,985	3,160
Oil	3,200	3,660	4,505	3,640
Time for clinkering	60 min.	137 min.	84 min.	164 min.
	Test made Oct. 13, '06.	Test made Oct. 6, '06.	Test made Oct. 26, '06.	Test made Oct. 26, '06

PLATE NO. 28.—*Temperature Top Fire* 1,000° *C. to* 1,200° *C.*

	15 Pounds Nozzle Pressure.	30 Pounds Nozzle Pressure.	45 Pounds Nozzle Pressure.
Generator blast	20 inches.	17¼ inches.	17 inches.
Carburetor blast	8½ inches.	7 inches.	7 inches.
Gas made per hour	72,470 cubic feet.	85,070 cubic feet.	82,110 cubic feet.
Gas made per run	13,069 cubic feet.	14,802 cubic feet.	15,341 cubic feet.
Oil used per minute	11.24 gallons.	11.19 gallons.	11.47 gallons.
Oil per 1,000	4.62 gallons.	3.88 gallons.	3.47 gallons.
Steam per 1,000 (estimated)	55 pounds.	68 pounds.	80 pounds.
Average length of blow	5.45 minutes.	5.31 minutes.	6.57 minutes.
Average length of run	5.37 minutes.	5.13 minutes.	4.64 minutes.
Average candle power	22.52 candle power.	22.03 candle power.	21.37 candle power.
Average B.T.U.'s	630 B.T.U.'s.	603 B.T.U.'s.	639 B.T.U.'s.
CO_2 in blue gas (per cent. by weight)	4.0 per cent.	12.4 per cent.	16.3 per cent.
Average temperature of bottom fire	530° C.	330° C.	460° C.
Average undecomposed steam	1.44 grams, cubic feet.	7.02 grams, cubic feet.	15.04 grams, cubic feet.
Number of glass with opt. pyrometer			
(a) Carburetor	7	22	17
(b) Bottom of superheater	14	16	15
Coke per 1,000	41.5 pounds.	37.9 pounds.	42.7 pounds.

pressure. It is submitted for reference only. It is valuable in that it shows the amount of steam used in the generator should be subjected to close adjustment. The quality of the gas, as well as the make, suffers when too much or too little steam is used. On one of these steam runs (not tabulated) the excess water was over 200 pounds per run. This is easily checked by passing the gas through a weighed tube of calcium chloride, using an experimental meter to measure the gas and weighing the tube at the end of the test. This excess water has considerable to do with the boiler fuel per 1,000. Finally, although the data submitted has been carefully prepared, and in most cases the analytical work checked, it is most valuable as a means of comparison by indicating what results different conditions will produce. It must be remembered that every water gas machine is a working unit, differing in many ways from every other water gas machine in operation. In the same manner it may be said that every water gas operator is a variable that must be studied and analyzed.

If this paper has interested you to the extent of checking some or all of this data at your own plants, and using your results as a means of control, then it has accomplished its purpose.

VOTE OF THANKS.

It was here unanimously voted that, in view of the splendid entertainment and banquet of the previous evening, together with many heartily offered other means of entertainment by the local Gas Company, its officers and the various committees concerned therewith the Association conveys through the Entertainment Committee the hearty thanks of the Association in acknowledgment thereof.

Motion duly seconded and carried.

President Strohn hereupon declared the Eighth Convention at an end.

[CONTINUED FROM PAGE 45.]

FOURTH ANNUAL MEETING, SOUTHERN GAS ASSOCIATION.

HELD IN THE SEMINOLE HOTEL, JACKSONVILLE, FLA., APRIL 17, 18 and 19, 1912.

SECOND DAY—AFTERNOON SESSION.

The President ordered that the discussion on the Leech paper (Meter and Meter Repairs) be resumed.

Mr. Ackerman (Continuing)—The paper notes (p. 3), "To keep the meter up to standard it should be periodically tested and overhauled. Gas companies vary in the length of this period from 18 months to 7 years; but the author thinks that 3 years should be the limit. Now, three years has been the limit of most gas companies that I have heard as to reporting these periodical tests. Atlanta formerly and for a number of years, followed the 3-year plan, but last fall we stretched that limit to 5 years, as to the smaller meters; on twenty's and thirty's, to 2 years; above "thirty's" every year. Of course this is an experimental stage, and we don't know just yet how the 5-year limit will work, but I personally believe that all meters above the 20 light should be brought into the shop for test onee a year. Another statement is, "A meter, when brought into the shop, should not only be proved but should pass through a strict examination." The operations in Atlanta shops are like this: Once a day, meters that are removed are sent to the meter repair shop. Each meter is read off and its record entered into book form. It is then subjected to a small flame or pilot test, and allowed to remain in shop from 18 to 24 hours before being put on the proving machine. The tests being made if the meters are found to be correct they are set off to themselves to be re painted. Those that run out, up to and including 8 per cent., are set aside for adjustment, except such as fail to pass the small light test—these are set aside for general repairs at once. As to the statement (p. 4): "If the lights burn unsteadily we know that probably the valves are sticking, in which case the top and back plate should be removed and the valves cleaned." Well, I find a number of cases where lights don't burn steadily, caused from condensation of water inside the diaphragm. That, of course, will cause a flickering light. Sticky valves will cause a like condition, as will a large hole in the diaphragm, there being no registration on the small light test. As to this bottle test spoken of by the writer on page 4, I have never experimented with it, but should judge from the way the paper reads, that it is a fine thing. As to this, "In operating the prover for proving and adjusting, it is necessary, for correct tests, to have both water and air of the same temperature." To be sure it is absolutely necessary to have the metal of meter at the same temperature as that of the water and the air, for which reason I hold a meter should remain in the shop from 18 to 24 hours prior to making a proving test. The author's means of raising his temperature in water in his proving machine is excellent. At one place as he states, it is much easier to describe the adjusting of a meter than it is to do the actual work. The real thing in proving or adjusting a meter, as the case may be, would not be to put it up to a green one who knows practically nothing about a meter other that it was a tin box. Let a man who does not know what a meter is or how it should be proved on a proving machine, throw a tangent with a soldering iron and he will shift that tangent a half-dozen or more times and several hours before getting a correct proof. In making that particular test it is necessary the latter should not only know what he is doing but he must also have a sense of touch that will guide him as to the distance the tangent is to be thrown for there is no given rule whereby one can be instructed how far to shift the tangent with the soldering iron. After the openings have been gotten together, by means of shifting the tangent with a soldering iron, the next operation is to move the nuts on the tangent, to lengthen or shorten the stroke. That can be determined by the use of a piece of chalk on the nut that he is going to extend forward or backward, for one revolution of this nut is 4 per cent. fast or slow, on practically all meters up to 60-light; above that, 2 per cent. He further says, "Care should also be taken to see that the bats on tangent are securely screwed up to the post." My term for "bats" is "nuts." I have seen meters coming from factories and repair shops that would not prove correctly when first received. Removing the top often showed the tangent nuts have been shifted one way, the other nut having been unseated. By simply screwing the other nut up to the bat or post, the meter will run again correctly. Again, "You will notice that when the diaphragms are worn out, it is nearly always where the leather has rubbed against some part of the case." Since January, 1904, Atlanta has been using a small, special diaphragm for 3, 5 and 10-light meters, sufficiently small not to touch the case at any point, and the majority of those diaphragms have held

(*Continued on page* 58.)

THE AMERICAN
GAS LIGHT JOURNAL

Entered at the Post Office, New York City, as Second-Class Matter.

Published weekly at 42 Pine Street, New York City.

Telephone Call, John, 2996. Cable, Am-Gas.

A. M. CALLENDER & CO., • • Proprietors.

THOMAS J. CUNNINGHAM, } Editors.
ELBERT P. CALLENDER, }
H. THURSTON OWENS, • Associate.

CHARLES H. WADELTON, Manager.

NEW YORK, MONDAY, JULY 22, 1912.

BRIEFLY TOLD.

JULY OUTING, SOCIETY OF GAS LIGHTING.—This year the July meeting of the Society of Gas Lighting was held in Boston, in conjunction with the Guild of Gas Managers, which conjunction was happily effected through the invitation of the officials of the Boston Consolidated Gas Company and the New England Gas and Coke Company. "Young's," of course, was headquarters, from which famous hostelry the joint forces sallied in automobiles to visit for inspection the Everett plant of the Coke Company. Two hours were profitably spent in this examination. The working scheme of the plant has been considerably enlarged this year, not the least notable addition being a modern water gas plant of huge dimensions. The inspection concluded, the visitors enjoyed a delightful sail to the beautiful quarters of the Point Shirley Club, where a complete (that's the word) shore dinner was served to 65 hungry gas men. President Richards, of the Consolidated Gas Company, was host; and that in itself is sufficient assurance that nothing was left undone that should have been done. The speechmaking was notable for short addresses by Colonel "Fred." S. Benson, President, Society of Gas Lighting—who is actually getting younger—and President Richards, of the Consolidated Company.

TEXT OF THE RULES FOR THE REGULATION OF GAS, ELECTRIC AND WATER SERVICE, STATE OF WASHINGTON.—We are indebted to the courtesy of Secretary F. M. Larned, of the Public Service Commission of Washington, for a copy (here reproduced) of the rules of the Commission respecting the regulation of the gas, electric and water service of that State, which orders became effective last month:

GENERAL RULES.—*Rule I.*—The following rules will apply to any person, firm or corporation now or hereafter engaged in the business of furnishing gas or electricity for light, heat or power, or supplying water for domestic, or commercial uses within the State of Washington. The word "Company" used in these rules shall be construed to mean any person, firm or corporation engaged in the business designated. The word "Commission" used in these rules shall be construed to mean the Public Service Commission of Washington.

Rule II.—The Commission shall designate two or more laboratories where the tests called for by these rules, other than those tests to be made by the companies, shall be made, and will appoint inspectors under whose direction the tests shall be made at the several laboratories so designated, or elsewhere as near as practicable to the locality where the test is desired.

Rule III.—Every meter for measuring gas, electric current or water, which has been tested for accuracy by the company furnishing the substance measured. or by any inspector appointed by the Commission shall have firmly attached thereto a tag or label giving the number. size (or capacity) of the meter, the date and result of such test, and by whom made. No such card or label shall be defaced or removed until a subsequent test shall be made and a later test-record attached. Each of such tags or labels shall have printed thereon the substance of this provision. This rule shall not apply to water meters when set outside of a building, underground an in such position as to make them liable to become submerged. Whenever any test has been made at the request of a consumer, the latter shall be notified in writing within ten days thereafter by the company, such written notification to contain all the information hereinbefore mentioned.

Rule IV.—Each company supplying gas, electric current or water shall make a test of the accuracy of a meter upon request of a consumer, and within ten days thereafter, free of charge, provided such consumer does not make a request for a test more frequently than once in twelve months.

Rule V.—If any consumer of gas, electric current or water desires any meter test other than that provided for in the preceding rule, said consumer shall first make application to the company, who shall have ten days within which to make said test and report the result thereof to the consumer, or to refuse altogether to make said test. Should the company refuse to make said test, or should the consumer not be satisfied with the accuracy of any test made by the company, the consumer may then make formal application to the Commission, who shall cause such test to be made by an inspector appointed by the Commission as soon as practicable after the receipt of the application. For such test made by the Commission a fee of $3 shall be paid by the consumer making the application, if the meter is found to be slow or correct within the allowable limit, and by the company owning the meter if the meter is found to be fast beyond the allowable limit.

Rule VI.—A complete record of all the meter tests made under these rules shall be kept by each gas, electric and water company, accessible to the public during business hours at its principal office in the town or city where the service is furnished, or at such other place as the Commission may designate. The records so kept shall contain complete information concerning the result of each test, showing the date and hour upon which the test was made, the name of the inspector conducting the test, the capacity and number of the meter and the percentage of accuracy obtained by the test, and such other data as the company may deem desirable.

Rule VII.—Each company supplying gas, electric current or water within the State, shall, upon written request of any consumer, cause the meter reader reading the meter installed upon the premises of such consumer, to leave upon such meter a card showing the date and time such reading was taken, and either the total reading expressed in cubic feet, kilowatt hours, gallons or other unit of service recorded by the meter read, or showing the position of the hands upon the dial of such meter at the time the reading is taken.

Rule VIII.—All bills rendered to consumers by any company for gas, electric current or water shall show the reading of the consumer's meter at the beginning and end of the period of time for which the bill is rendered, and shall give the dates at which the readings were taken, the number of units of service supplied, and the price per unit; and said bills shall be made out in such a way as to be readily understood by the consumers.

Rule IX.—Each company supplying gas, electric current, or water may require a deposit or advance payment or other security from the consumer before service is supplied, providing that the amount so required shall not exceed the estimated monthly bill from such consumer. Interest at the rate of 8 per cent. per annum payable annually (or upon the returning of any deposit covering the time of the deposit) shall be paid by every company to its consumers upon every deposit so required, provided said deposit remains for a period of at least six months, and provided further, that interest shall cease when the consumption of the product used ceases. If the reasonableness of any rule, regulation or practice of any company with reference to deposits and advance payments is challenged, the Commission shall, upon investigation, prescribe the proper rule, regulation or practice which shall thereafter be followed.

Rule X.—Each company supplying gas, electric current or water shall keep a record of all interruptions of service upon its entire system, or major divisions of its system, and include in such record the time, duration and cause of such interruptions, and such record shall be open at all times to public inspection, and the Commission may at any time require from such company a copy of such record.

Rule XI.—No rental shall be charged by any company supplying gas, electric current or water for any meter installed by it.

Rule XII.—Each company furnishing gas, electric current or water shall keep a record of all complaints made to it by its consumers which record shall include the name and address of the consumer, the date, a statement of the complaint, and a statement of what the comaany did in reference thereto; and such information shall be furnished to the Commission upon request.

SPECIAL RULES.—GAS.—*Rule XIII.*—Every gas company selling more than 15 million cubic feet of gas per annum shall, when required by the Commission, provide itself with equipment necessary for test-

ing meters, such equipment to consist of a standard meter prover with suitable accessories to be approved by the Commission.

Rule XIV.—Each gas meter shall be tested and accurately adjusted previous to its initial installation, and a gas meter shall not be allowed to remain in service longer than 5 years without a test being made. If found to be inaccurate, when compared with the standards adopted in these rules, such meter shall be immediately readjusted and corrected.

Rule XV.—A meter may be considered as correct if when passing gas at the rate of 6 cubic feet per hour per light capacity it shows, in comparison with a standard gas prover, an error which is not greater than 2 per cent. either fast or slow. Meters must not leak and must deliver gas without any noticeable fluctuation in the light caused by the mechanical operation of the meter. Meter dials shall read directly in cubic feet of gas.

Rule XVI.—Each company whose output exceeds 10 million cubic feet per year shall equip itself with a standard calorimeter outfit, with which periodic tests upon the gas shall be made not less frequently than once each week. A record of these tests shall be made and kept open for public inspection.

Rule XVII.—All gas furnished to consumers for lighting or heating purposes shall show a monthly average total heating value of not less than 600 B.T.U.'s per cubic foot, with a minimum which shall never fall below 550 B.T.U.'s per cubic foot.

Rule XVIII.—Each gas company shall make daily measurements of the pressure and pressure variations, and these shall be kept on record and open to public inspection.

Rule XIX.—Each gas company whose output exceeds 10,000,000 cubic feet per year, shall maintain at different points on its mains, 1 mile or more from any distributing station, two or more recording pressure gauges, by which means a record of pressure at all times shall be made, and these records shall be kept on file and open for public inspection at the principal offices of the company in the city where the service is rendered.

Rule XX.—Gas pressure, as measured at meter inlets, shall never be less than 2 inches nor more than 5 inches of water pressure for a period of more than an hour: *Provided*, That in localities where there is a difference of elevation of more than 125 feet between different sections of a city or town served by any gas company, the maximum limit of pressure allowed by this rule may be increased to an amount above 5 inches, not exceeding 1 inch for each 125 feet of elevation of consumer's outlet above the gasholder supplying that section.

Rule XXI.—In no case shall gas sold for lighting or heating purposes contain more than 30 grains of total sulphur per 100 cubic feet, nor more than a trace of sulphur as sulphuretted hydrogen.

Rule XXII.—In no case shall gas sold for lighting or heating purposes contain more than 5 grains of ammonia per 100 cubic feet.

SPECIAL RULES.—*Electricity.*—*Rule XXIII.*—Each company supplying electric current shall, when required by the Commission, provide itself with suitable equipment for the testing of meters, and shall employ such methods of testing as are approved by the Commission.

Rule XXIV.—Each electric service meter shall be tested and adjusted for accuracy previous to its initial installation.

Rule XXV.—Each electric service meter shall be tested at least once each 2 years by the company furnishing the service; the test to be made by comparing the meter with suitable standards, on one-tenth load and full load rate of operation.

Rule XXVI.—No electric meter which registers upon "No load" shall be placed in service or allowed to remain in service.

Rule XXVII.—No electric meter shall be placed in service or allowed to remain in service which has an error of registration in excess of 4 per cent. on one-tenth load or full load.

CURRENT MENTION—

WE have scant mention of the death of Mr. William Hobson Vollum, who succumbed to an operation for appendicitis, performed in a private hospital at Ridley Park, Pa., the afternoon of July 13th. Deceased whose last position in the industry was Superintendent to the North Penn Gas Company, Fort Washington, Pa., was born in Philadelphia, Pa., March 24th, 1876, and graduated from the Central High School of that city. His first experience in business was along newspaper lines, and later on he became identified with the gas industry, his first important connection therewith being in the service of the New Orleans (La.) Gas Light Company, shortly after Mr. Thos. D. Miller became the Chief Engineer of the New Orleans plant. Later on he returned East, finally locating in Fort Washington. He was a member of the American Gas Institute.

THE proprietors of the Freehold (N. J.) Gas Company have established the following revised selling schedule, which became effective the 1st inst.: Gas used on illuminating account, first 5,000 cubic feet per month, $1.60 per 1,000; all in excess of 5,000 on illuminating account in any one month, $1.20 per 1,000—with 10 per cent. off for prompt payment, or within 15 days. All gas sold for fuel purposes will be billed at $1.20 per 1,000, less 10 per cent. for prompt payment.

"OUR sons their fathers' fading footsteps see. And such as Chaucer was shall Dryden be." A quotation that surely applies in this instance, for Master Woodbury E. McKay, who traces his paternity to that prince of Eastern gas men, Captain William E. McKay, General Manager of the New England Gas and Coke Company, has been sworn in as a mid-shipman, United States Naval Academy, Annapolis, Md. Our informant adds: "In the examinations to determine his fitness to enter the Academy Mr. McKay took first place. May he keep on the way as his father did; if he does he will have nothing to forget.

THE National Light and Power Company, of St. Louis, announces a sale of $100,000 first mortgage, 30-year, 6 per cent. bonds, on its property in Texas known as the Amarillo (Tex.) Gas Company. The purchasers were Messrs. A. G. Edwards & Co., of St. Louis.

THE New York *Herald*, of the 17th inst, reports that control of the $50,000,000 Columbia Gas and Electric Company, which is the holding corporation for all the gas and electric lighting properties in Cincinnati, O., has been sold to a syndicate, of whom the well known financial house of A. B. Leach & Co., of this city, are the principals. This likely means the retirement of Mr. Archibald S. White, President of the Columbia Company, from active business, which would be a regrettable fact, for his conduct of the affairs of this concern from its start has been such as to challenge the admiration even of his astute associates.

THE Board of Gas and Electric Light Commissioners, of Massachusetts, as the result of a protracted hearing, has advised that the charge for 4-ampere street arc lamps, burning on all-night schedule, provided 900 of these are steadily maintained, be reduced from the ruling rate of $91.25 per lamp per annum, to $80.30 per lamp. This order, or "advice," is the sequel of the petition of the Mayor of Worcester, who complained that the rate paid per lamp was excessive. This maximum figure has prevailed since 1906, and the Company's case was greatly weakened by testimony showing that, since such date, notable concessions had been made in the charges to private consumers, for or with similar service.

RECENT advices from Wichita, Kas., respecting the Kansas City (Mo.) Gas Company, as to its initial preparation to manufacture gas for its patrons show that Mr. L. O. Ripley, Vice-President and Manager of the Kansas City Gas and Electric Company, said: "The Kansas City Company is doing what we and all other natural gas concerns realize must be done; that is, to be prepared to give customers artificial gas when the natural supply runs out, as it surely will in time. We know gas will be manufactured in Wichita in a few years, if not sooner, and we are now in consultation with the best gas engineer in the country about building a manufacturing plant. We will have our real estate ready and our mains prepared when the time comes, and we expect to keep the public informed."

Publications.

[All Publications, Catalogues, etc., mentioned below, are kept in our office for the convenience of our patrons.]

Calorimetry.—Bulletin G2, of the Precision Instrument Company, contains a detailed description of the Roland-Wild calorimeter, which is now so largely used for analyzing and estimating the heat value of solid fuels.

Gas Producers.—A condensed survey of the field of usefulness of the gas producer may be found in Technical Paper, No. 9, Bureau of Mines, by Mr. R. H. Fernald.

Graphite.—The July number of this newsy publication of the Jos. Dixon Crucible Company contains much about human nature, and tells something respecting graphite. Ask to be placed on their mailing list.

Baltimore Gas and Electric News.—That the business of supplying gas and electric service is one of many interests, of great diversity, is well portrayed in the publication, published monthly by and in the interests of the (employees of the Consolidated Gas, Electric Light and Power Company, of Baltimore. It contains data and information, some personals, and the basis upon which *esprit de corps* is a live and potent factor throughout the whole organization.

Industrial Railways.—The comprehensive system developed during the past 30 years by the C. W. Hunt Company is clearly depicted in a well illustrated, 80-page catalogue. Those who have goods to move would undoubtedly benefit by examining a copy.

Hydro-Electric Development.—A very handsome, as well as a readable, brochure, in colors, entitled, "The Power of Ocoee," has been issued by Messrs. J. G. White & Co. It completely describes the hydro-electric development on the Ocoee river, Parkville, Tenn.

(*Continued from page 55.*)

good to now. Some few have had to be removed, caused by a deposit of rust that dropped through the crating, getting inside the diaphragm, the pulsation of which would be cut in two at bottom. Again, "For quickly and efficiently grinding valves, nothing is better than No. 1 emery cloth on a block." At this point I will have to disagree with our writer very largely. Atlanta formerly used dry glass with paper folded over it. Later we glued paper to it. We find this sand paper grinds the seats hollow, even though you use a new piece on each seat; likewise the covers. The best thing with which to grind is a steel block planed perfectly smooth, and scratched diagonally from corner to corner or similar to a bastard cut file. This will remove all deposits on seats or covers, as well as the hard spots in the mixture of the metal, grinding your seats and covers to a perfectly flat surface. It will not do to grind the seats and covers both straight. One may be left straight, the other crossed, for if the two are straight the cover and seat will soon lock together. As to the lines "New meters and repaired meters are frequently damaged in transit from shop to location." This is a point that the writer has not "stressed" strong enough, and I am unable to tell how anyone could "stress" it strongly enough. Fitters, in carrying meters from point to point to set, get careless, even carrying them by hand. Having a job causing him to stop before he has reached the place where he is to set his meter, he dumps it on a sidewalk or just inside of a yard. If it turns over on its side or back it is allowed to so remain. Going into the house he often slams it to the floor as if it were a piece of lead, that is he uses practically no care. In this connection Mr. Wimberly has his shop to the point where they are afraid to make a noise on the floor in setting a meter down, so the meter is kept straight up. It is well known that, by letting a meter lean forward or backward or sideways, when hauled in a wagon over cobble stones or rough roads, there is a posibility of bending the cover of the arm, which is made of soft metal. In such case, when your meter is set it will not register. A competent fitter noting this will not allow it to remain, and the careless fitter lighting up the house and seeing a sufficient gas flow, but failing to test on registration account will leave a non-registering meter in the house. Then, "The diaphragm should be cut from selected sheep skin." Here is a point after which manufacturers must look very closely; that is, to select a full skin, seeing that it is well tanned, with bark instead of acids, and that the seams are properly sewed. As to the writer's make-up of a meter. His idea is good with two minor exceptions; one possibly he overlooked, the other that he may contend over. He says, "The stuffing boxes should be large." I hold that the stuffing boxes should be increased in length, not in diameter. By increasing the latter, a greater amount of packing is needed to stuff the box and allow further passage of gas as readily as the present box. By the use of a long, narrow stuffing box, your gas has considerably greater distance to travel, and your box will stay tighter a longer length of time. On page 8: "A dial showing definitely the amount of gas unconsumed, still due the consumer." It is a well known fact that the first prepay meter on the market had a dial similar to this which showed the consumer the amount of gas due at all stages of the game. I believe this is wrong, and for this reason. When a prepay meter is shutting off, should any deposit be carried by the gas to the seat as the cover comes down, it necessarily is compelled to squeeze that deposit from underneath before it can shut off. In doing this, the shut-off lever is sprung, sometimes being broken off. If only sprung, the indicator will come back beyond the starting line. So when a consumer puts in his next 25 cents, if he had a dial showing just what he paid for, his indicator would fail to reach that point, and the office would get a complaint at once that they had put 25 cents in the meter, while the indicator showed they got only 15 cents worth of gas. Hence that is a bad feature. As to the arrangement to close the slot automatically after a coin has been inserted, I believe it would be a good thing, although I have never seen anything of the kind. One more point I would like to add. In Atlanta—and from all other gas works that I hear about—we have many leaks around the glass of the dial, and it seems a matter almost of impossibility to find a putty or cement that will withstand the gas any length of time and prevent a leak at that point. All fitters should be instructed on testing for a leak, not to apply a match around the index. It is a dangerous proposition. I applied a torch on one occasion to a 30-light meter at the glass. The meter blew up, and I was in the hands of a doctor for 10 days the glass and enamel of the index being buried in my face and neck.

The President—That is a most excellent discussion on this subject.

Mr. Ackermann—On bottom of page 2 Mr. Leech says: "It is a common impression of consumers that if a meter is leaking they pay for all the lost gas. This is not so unless the leak is in the outlet pipe, otherwise the loss is entirely the company's. When the leak is beyond the meter outlet the leakage is fairly constant, except when gas is being consumed, then the loss to consumer is in inverse proportion to the amount being used." Further, on page 3, he speaks on adjusting a bill when the meter is found leaking at the bottom. The contradiction may be more apparent than real, but thought I would ask for an explanation.

Mr. Leech—It's a common impression with consumers that if a meter is leaking they pay for all the lost gas. They don't pay for all, only for some of it. When the gas is not being used they don't pay for any of it that is being lost, the gas company standing it, but when they are using gas the loss is in inverse proportion to the amount they are using.

Mr. Ackermann—Does the leak in the bottom register against them?

Mr. Leech—It means that the meter is registering more than they use if the leak is in the bottom.

Mr. Hutchinson—Is it not so that while that chamber is filling with gas the gas company loses the gas and when the chamber is empty the consumer loses it?

Mr. Leech—Yes, Mr. Hutchinson is right. If one chamber were filled all the time, then, of course, the dial would mean that, whichever side was being used, the loss would be either to the consumer or to the gas company; but, taking it over a period of time, say for ½ hour, then we get our figures for what proportion is lost to the consumer.

Mr. Zeek—Neither Mr. Leech nor the gentleman from Atlanta speaks of dipping meters. As that is coming into practice, is one ful l of promise and has been widely adopted, wouldn't it be wise to get this on our records so those reading the "Proceedings" may have it before them as well? I am curious to know why Atlanta changed from 3-year tests to 5-year on small meters.

Mr. Congdon—As to dipping meters, we went into that pretty carefully. I talked with Mr. Battin, of the United Gas Improvement Company, who has had a very wide experience in reference to dipping meters, and he thought that Atlanta should provide for such an arrangement. Taking the matter up with Mr. Ackermann, he said, during his experience covering 20 years with the Company, he had never seen a bleached meter in Atlanta unless that meter had been placed near a furnace or in some hot location. He made a test, I think, of one hundred 5-light meters, and measured the actual condensation in those meters. He showed it wasn't necessary. I gave Mr. Battin a written account of this test and of Mr. Ackermann's statement, and the reply was for our condition certainly we didn't need to dip meters. This satisfied us, as far as Atlanta was concerned. In other places, where straight water gas is made, perhaps they may have trouble, but we didn't have any at all because of bleached meters. As to our changing from 3-year to 5-year test, on the smaller meters, that was more or less of an experiment. Investigating the custom of other places (Chicago, for example) I believe, every 7 years tests the smaller meters, and our experience on the 3-year test seemed to indicate it isn't necessary to test them so often, at least for our condition. The larger meters (100-light and over) we test every year; between 20 light and 100-light, we test every 2 years; the 5-light, every 5 years. Our experience may demonstrate later that we might better go back to the 3-year test.

Mr. Leech—Mr. Ackermann, of the Atlanta Gas Light Company, objected to the 5-light meter while favoring the 20-light vessel; that is, meters of large capacity. I would like to ask just what his objection to the low capacity meter is as compared with the high capacity.

Mr. Ackermann—I didn't make any reference to the 5-B meter at all.

Mr. Redding—We have been discussing the meter principally from the standpoint of the gas operator. When Mr. Leech wrote his paper and brought it to me, I thought it might be a good idea to have an expression from the manufacturers of the meters, principally from those who might not be represented, so I took the liberty of sending copies of the paper to several of the large meter manufacturers. I received four or five replies. I asked the manufacturer to make a very candid criticism of the paper for my own benefit, not necessarily for presentation to the meeting; but of the answers I received, three of them are of such a nature that I think they will be of service to the Association, in that they show the manufacturer's point of view, both from the standpoint of use of a meter and from the standpoint

of manufacturing the meter—the trend—so I am going to take the liberty of reading the three:

"Your letter of the 11th inst., inclosing paper on 'Gas Meters,' by Mr. Leech, duly received. I have gone over this paper carefully and have enjoyed reading it very much. It shows careful study of the subject on the part of Mr. Leech, but, while agreeing with him on most points, there are some upon which I differ It has been my experience to have had charge of the meters of the largest gas company in this country for nearly 13 years, during which time I made a study of the subject, and a great number of statistical tables were compiled. The more one studies the subject of gas meters the more one realizes, if unsatisfactory results are to be avoided, it is necessary to act along conservative lines. Moreover, it does not seem practicable to make a set of rules which will meet all requirements. It would seem as though the most important requisite of a meter is accuracy in operation. Second in order of importance would seem to be the durability (or life) of the meter. Third, the ease and facility of meter repairs and the reduction in cost of repairs to a minimum. The continued efficiency of a meter depends very largely upon its location and the kind of gas it is required to pass. The meters should be located so as not to be exposed to extremes of temperature, as there is a probability, if located in a cold place, condensation will accumulate, thereby causing the valves and diaphragms to get gummed up, the natural tendency of which is to cause the meter to register slow. On the other hand, a meter should not get in a location which is abnormally warm, as there would be a tendency in this case to cause the leather of the diaphragms to dry up and harden, which will in all probability result in the meter becoming fast. Mr. Leech refers to a number of the manufacturers putting on the market what they call 'large capacity meters.' This procedure on the part of the meter manufacturers was simply due to the demand made upon them by the gas companies for action along these lines. There are a large variety of styles of the same size of meters as now manufactured by the various companies, and the great difficulty in bringing about a standardization of gas meters is due almost wholly to the impossibility of getting the gas companies themselves to agree to any standard type of meter. There is no question in my mind but that the meter manufacturers would only be too glad to standardize their product if they could get the gas companies themselves to agree on one common type. I do not exactly see the point gained by Mr. Leech gauging the amount of gas a consumer would lose by a leak, by puncturing a hole in the bottom of the meter, as a leak in the bottom would not cause the meter to register. It would seem far simpler to have made the experiment by placing a small leak in the piping beyond the outlet of the meter and made the experiments along these lines. I think the time Mr. Leech would leave the meter on the district before overhauling it is altogether too short, as good practice in New York and vicinity would seem to indicate that 7 years is about the proper time. I think, if Mr. Leech adopted a different method as to determining the class of repairs to a meter, he would find that in all probability the meters would stay on the district to better advantage and a much longer time. Unless a meter has been in service only a short time, and upon examination there is found to be no condensation in it, it would seem to be preferable, on bringing in the meter from the district, to take off the back plates and casings, and make a thorough examination, in preference to making so many tests to determine the exact class of repairs. The additional cost of taking off the back plate and oiling the diaphragms is so slight, in comparison to the total expense of removing the meter and making slight examination, that it would seem preferable to have the meter thoroughly overhauled before replacing in service. As above stated, if this procedure were adopted, in all probability the meter would work to better advantage and would remain in service much longer. Mr. Leech seems a little inconsistent in some of his recommendations. He criticizes the radical move which has been made in so largely increasing the capacity of the 5-light meters. Notwithstanding this, he advocates the placing of a diaphragm in the meter which will not touch, consequently increasing the number of revolutions per foot. Personally, I think the larger diaphragm, with the leather touching the casings of the meter, preferable to the meter making fewer revolutions and with a small diaphragm. I think Mr. Leech would obtain better results by using some style of whetstone for grinding his valves and covers in preference to emery paper. Also, that in bringing a meter in from the district it would seem preferable to test the meter for tightness before proving or testing under small lights. The above are some of the criticisms which have suggested themselves to me in reading the paper, and are made in all spirit of fairness, and trust you will take them in this manner.—Yours very truly,

"American Meter Co., W. K. Harrington, Manager."

"The paper of Mr. Leech, upon meters and meter repairs, is a very practical and sensible presentation of the subject. We especially commend him for his remarks upon the care with which meters should be handled. As he states, a meter is a delicate and nice instrument, and should receive great respect from those handling it. The delicate parts inside not being seen, it is natural to be careless when the simple exterior only is evident. A meter should not be jostled upon a wagon, and the beauty of its construction is shown by the correctness after the rough treatment often received. When a meter is disconnected the openings should be immediately closed, preferably with a tin cap, to prevent the admission of air and moisture. Very often meters removed are in very good condition at the time, but after being allowed to stand, with the openings not closed, complete repairs are required. The greatest difficulty with which meters have to contend is from condensation, and it would be profitable for gas companies to pay more attention to the removal of all the condensation possible in the works, instead of permitting it to collect in services and meters. The expense of attending to complaints and repairs to meters amounts to a considerable sum, which would more than cover the interest upon ample condensing capacity. It is hardly necessary to say that gas should be properly purified, as meters can be injuriously affected by an excess of sulphuretted hydrogen or ammonia. Gas consumers generally do not realize that meters are made upon a scientific plan or that they are wonderfully reliable, and the more general information disseminated upon the subject the better, to remove distrust of the gas company and its employes. We prepared a leaflet a few years ago, with a popular description of a gas meter for this purpose, the use of which is free to any gas company. A number of gas companies have adopted what is known as the dipping method, in which a quantity of neutral oil is introduced into the bottom of each meter, so that the diaphragm can take up this oil to replace that removed from the leather by the constant exposure to gas, especially from certain qualities of water gas. The results have been very satisfactory, both in maintaining correctness of registration and reducing the cost of meter repairs. The small flame test of meters *in situ* also has many good features. In this way, if meters are found to register at a small rate of flow, they are permitted to remain set, without disturbance. The results of a number of tests indicate when a meter registers at a very small rate that it is registering correctly. Very truly yours,

"Helme & McIlhenny."

"I have read Mr. Leech's paper with a great deal of interest and, among the other good points covered by his paper, must acknowledge that his methods of procedure in regard to testing meters for leaks, and in fact, all that relates to the repairing of meters in general, are fully up to the most advanced standards. There is nothing in the ground he covers that can be omitted, if it is desired to turn out good work; nor, on the other hand, is there anything added that is unnecessary to be done. Any concern following the rules laid down in this paper will certainly get good results. It is certainly gratifying to hear a gas man speak so appreciatively of the value of the meter. Here-and-there we occasionally find one who has a good word to say in behalf of what I think is the best friend the gas man has; but an experience of many years on the road, as well as a large correspondence with various companies, convinces me that the average gas man does not fully appreciate the care and skill required to make a durable, accurate meter, and too often looks only to the price of the meter regardless of quality. Mr. Leech's remarks in regard to the folly of such a mistaken idea are both true and timely. A cheap meter, or one that has nothing to recommend it but a low price, is a worthless article. I note Mr. Leech's remarks in regard to the large capacity meter, and fully agree with him, that it is better to be a little conservative about to so-called improvements than to rush headlong into them before they have demonstrated their value. He very pertinently asks if this type of meter will give the service that the old type has given, and answers his own questions in a manner that indicates a doubt whether it will, and in this I think he is unquestionably right. It occurs to me that some gas men, in their desire to get more for their money, have been unintentionally led from the sane and well tried paths of long experience in regard to the ratio between capacity and length of service, into the alluring, but as yet somewhat uncertain, paths of "enlarged" capacity, only to

find that in the long run there has been nothing gained by it; for in this, as in other things, the inevitable law prevails, that the harder and more destructive the work is, the shorter must be the life of the worker.—Very truly yours, KEYSTONE METER CO., JNO. H. MANSUR."

Mr. Redding—I am not going to assume to attempt to criticise or comment upon either Mr. Leech's paper, or those that I have read. The most I can say about the paper is to give you the results that have been secured in Macon since Mr. Leech took charge of the meter department. In 1909, the unaccounted-for gas in Macon was 14 per cent. The station meters were overhauled and put in good condition. In 1910, the unaccounted-for gas was 17 per cent. By that time, I had persuaded the Directors of the Company to set aside some money for overhauling the mains and instituting an up-to-date meter repair department. We had had, previous to my time in Macon, a meter department, but not of a very high grade. We did work both on our mains, looking for leaks, and started a systematic overhauling of our gas meters, beginning about the first of 1911. We practically completed the overhauling of our mains, the 1st of June, 1911, and had reduced our leakage from an average of 17 to 14 per cent. by that time. January 1, 1912, our leakage for the year was down to an average of 12 per cent., and for the last ½ of the year down to 10 per cent. From the 1st of January to date, our leakage is considerably under 10 per cent.—pretty close to 9 per cent.—and we hope to keep below 10 per cent. The major part of that reduction in the unaccounted-for gas is due to the systematic overhauling of meters as carried forward by Mr. Leech. We have, in addition to the letters that I have read by the manufacturers not represented, several representatives of other meter companies, and I would like to hear from them as to what they think of the gas meter from the manufacturers standpoint.

Mr. Congdon—In figuring the leakage, do you correct for temperature at the station meter and also at the consumer's meter?

Mr. Redding—At the station meter, but not at the consumer's.

Mr. Congdon—Don't you believe that in many instances the gas corrected, when 60° at the station meter, for example, is sold at a higher temperature than at consumer's meter?

Mr. Redding—Without doubt; perhaps it would be opposite in the winter time. We correct for the station meter, but we do not correct for the consumer's registration.

Mr. Congdon—I asked that question because it was the custom in Atlanta for years, long before I ever went with the Company, to correct both places. In the winter time a good deal of the gas is registered at a lower temperature than 60° at the station meter, and in the summer time at a higher temperature. The U. G. I. people years ago made tests in different sections of the city at different seasons of the year, and got some knowledge of the temperature at which the gas was sold. It has been our custom to correct gas both at the works and at the consumer's meter.

Mr. Redding—Don't you think that the correction on the consumer's bill is only an approximation, the conditions of the station meter and the consumer's meter being so widely divergent.

Mr. Congdon—Certainly it is.

Mr. Redding—It is only an approximation at best.

Mr. Congdon—Does Mr. Zeek usually pursue that custom, or policy in Pensacola?

Mr. Zeek—Yes, sir. It seems to me that if one is to correct at one place logically and properly one should correct at the other, and if we assume that nature will right that thing for us at the consumer's meter, then why correct at the works? The temperature at the works will follow the temperature at the consumer's meter right through the year.

Mr. Redding—The temperature of the gas as registered in the consumer's meter is practically that of the ground through which the service passes. In New Orleans not long ago, I kept record for a year of the range of temperature at a depth of 4 feet below the surface. The maximum was 72°, the minimum 62°, or a variation of 10° within the year. Assuming that to be a typical condition, then the question of correction of consumer's meter is not essential, unless you use a standard factor all the time, by experiment for the year, and use that for the entire 12 months. I do not know whether Mr. Congdon uses one factor for July, and another for December or not. How do you determine that?

Mr. Congdon—The U. G. I. Co. determined it for me before I took charge, and have been using it ever since. It was a different factor, of course. for each month in the year.

Mr. Redding—And a different factor, perhaps, for each State?

Mr. Congdon—I can't speak for the States. Referring to what Mr. Redding said about having taken the temperature of the ground. If the service pipes pass through the ground directly into the cellar, the record of ground temperature would be very important; but in the houses at Atlanta—I presume they are alike throughout the South—few have cellars, and service pipes frequently come up under the house and are exposed; so that, although your ground temperature might be very constant, you would have a very wide variation in the temperature of the gas on account of the service pipe being exposed.

Mr. Zeek—Our Company undertook to get at the actual conditions of registration—the ground temperature and other factors of that nature were looked into. Our tests to get at the factor were made this way: We took two thermometers, placing one in the outlet of the meter, the bulb of the thermometer being in the flow of the gas, then carefully standardized the thermometer to the same scale as the one in the meter that hung alongside, and it was surprising to us how these two temperatures followed each other; in other words, it was practically the atmospheric temperature. We had only one cellar in the place (the government building) where we took tests. The windows were open in the basement nearly all the year through, but during the time they were closed, unless it was when they were closed, the registration on the meter was of the same temperature as the atmosphere. So I don't believe that ground temperatures get practically any higher. We run up out of an inch or 1¼-inch service pipe into a very much larger capacity than the meter, and then it depends, of course, upon the consumption in the houses how rapidly the gas is changing in the meter. We took all these tests during the peak of the load at night, to get the highest possible load, and were surprised to find they were all the time to atmospheric temperature. While atmospheric temperature was not used, the actual temperatures of the meters were used; still it was close enough for all practical purposes to make atmosphere tests.

Mr. Dexter—I made some experiments by a thermometer in the outlet of a meter in my own house, covering both seasons of the year, one being in summer. The result was practically followed within 3° of the station meter temperature, season-in-and season-out: very nearly the temperature at the station meter was the same as the consumer's meter.

Mr. De Frese—Did you correct your gas?

Mr. Dexter—I corrected it to the office meter, with the station meter, but not the consumer's meter. I should do it from that data, and use practically the same factor or the same temperature as my station meter.

The President—The time of limitation is about applicable to this discussion. We would like a word or two from the meter manufacturers. Will Mr. Gribbel favor us.

Mr. Gribbel—One thing that struck me very forcibly about this convention is the happy way the members seem to have of handing red roses to each other. I haven't heard any paper read that didn't seem to be exactly along the lines of the opinions that must have been had by all the men who are here, and I find myself in the same position; but when you come to figure out that the man who wrote this paper had 7 years' experience in Glover's factory, in London, the cradle of the gas meter industry, and from there went to Hopkinson's place—Hopkinson made the first drum—then came over on this side and went with the U. G. I., who probably stand among the leaders in the gas industry, it isn't surprising that the manufacturers appear a little bit timid about criticising any of his paper. One thing that particularly pleased me, is at the bottom of the first page, where Mr. Leech refers to the large capacity meters. As Mr. Redding told you that departure was made by the gas meter manufacturers, and it was an answer to a demand on the part of the United Gas Improvement Company. At the time those meters were put on the market, several of the older manufacturers went on record as being opposed to them, on the ground that the temptation would ultimately be for the manager to put a high capacity meter in a situation where the demand on it would constantly be on its rated full capacity, which would be in excess of the ordinary meter of that size, and more nearly approximate a meter of 3 or 4 sizes ahead of it; and that has worked out, that has been proven the fact. The result is that a great many of the gas men to-day are reverting to the old policy of putting in a regular large-sized meter rather than a small-sized meter, with a tremendous capacity, because they found that, over a term of years, the performance of the regular meter—and by that I mean the standard meter, not the A, or the B, or any other fancy type meter—gives greater service over this term of years; and it's rather pleasing to find a gas man knows that fact. The only criticism I can make about Mr.

Leech is that he is in the right church, but in the wrong pew; he ought to be a gas meter man rather than a gas man. At one point Mr. Leech writes, "It seems to me that, next to the actual manufacture of gas, the meter ought to be of most importance." Now, that strikes me as particularly true, and important when you come to billing it out. The gas meter is practically the yard stick of the company; it's the thing that determines your revenue, and that should be about as important a feature as you have around the whole plant. If the meter itself is not accurate or faithful, what ultimate good can a company get from spending a tremendous amount of money at the plant? As Mr. Davis, of Mobile, said yesterday, the gas man cannot itemize his bill; and Mr. Leech has, at the bottom of the second page, the same thing. It struck me as being particularly true from the gas man's standpoint. On page 5, Mr. Leech, speaking of adjusting and proving meters, says that this should not be intrusted to anyone but a skilled workman. That is particularly true. The art of accurately proving meters is a pretty difficult thing to acquire, and it is only acquired after a period of painstaking effort. It isn't a thing a man can stumble across in one or two afternoons. It must be acquired. On page 6, he says: "The practice of adding a small piece of packing to that which is already there is a bad one, as it tends to make the meter run hard." This is particularly true, and I would like to caution the gas meter repairers against that sort of thing, because I have known it to cause us trouble. I have had instances where that thing was done and where it inevitably resulted in the meter binding. It is far better to repack the whole stuffing box than to attempt to cram in another small piece of packing. On page 7 he states the meter should always be kept in an upright position. That is particularly true. On page 8, speaking of the prepay meter, he says, "In the prepay meter there should be as few working parts as possible, and these strongly constructed, the price changing arrangement simple and easy of access." That is assuredly true, because the prepay meter always seemed to me to sort of fill the place of a doctor; that is, when you want one you want a good one and you want him right on the job. Simplicity in construction and strength of the parts of these things that a prepay meter can be made mainly serviceable in, are necessary.

The President—Any other representative of any meter manufacturer present who desires to take part in the discussion? Mr. Hutchinson?

Mr. Hutchinson—I have enjoyed Mr. Leech's paper very much, but must disagree with him in the statement that there has been no improvement in the gas meters in 50 years. However, I don't want to stir up a discussion on any improvements that have been made in the meter business, because it might bear the ear marks of advertising.

Mr. Scofield—While anything that I might say, gentlemen, is strictly impromptu, I have only to say that, when you get representatives discussing any proposition, and they are on different articles, they will disagree; but I will say that Mr. Leech's paper on the meter, being next to the most important feature of the gas business, is absolutely correct; and if we stop to think that the gas meter is the revenue maker of the company and that it is similar to a chart, when it isn't correct its usefulness is over. Close attention should be paid to the gas meter, and while we imagine a good many times that we are paying close attention to it by taking it out every 3 years and giving it a test, we should examine closely the method of test, checking our proof to see that it is correct, to get an approval that is going to give us a proper test of it. I think the improvements that have been made in the gas meter business—for instance, in the large capacity meter—that it is not expected that a gas meter will will work at that large or full capacity all the time; but that, if the occasion should require, a Christmas holiday extra feast, or anything like that, where the extra gas is needed, it is there. There is the point, gentlemen, and I think most gas meter salesmen will more or less have an argument in reference to the different styles of meter, over all of which we cannot agree.

The President—Mr. Leech, do you desire to close?

Mr. Leech—As our time is limited, I will take up the dipping of meters and the matter of cast iron meters. I fear if I mentioned anything about cast iron meters, it would be personal. As there are only three makes of these of which I know, I really couldn't refer to any of them without pointing to the particular man, so you will kindly excuse me for making no reference. With regard to dipping meters, I have had some experience in Philadelphia with these. It certainly worked out finely, but in a small company, unless it has the facility for handling the meters in very careful manner, it will have all kinds of trouble. In Philadelphia they have specially constructed wagons with boxes for the meters to set in. The boxes are upholstered inside, so there is really no chance for running into the valve chamber. Unless you have a wagon constructed and men trained to handle meters carefully, I do not think it wise policy to put any oil in the meter.

On motion of Mr. Hutchinson, a rising vote of thanks was tendered to Mr. Leech for his excellent paper.

REPORT OF COMMITTEE ON OBITUARY RESOLUTION.

The Committee appointed to draft suitable minutes to the memory of the late C. R. Gillette, presented the following, which was adopted as read:

Whereas, We have recently learned of the death of our esteemed friend and associate, Mr. C. R. Gillette, of the Lindsay Light Company; and

Whereas, The expressions from all members of this Association who knew Mr, Gillette convey the popularity enjoyed by this brilliant man, so unfortunately removed from our midst by death, it becomes the desire of the members of the Southern Gas Association to express most profound sympathy to the family of our beloved friend; be it, therefore,

Resolved, That these resolutions be adopted and recorded in the minutes of this, the fourth annual meeting of the Southern Gas Association, and that the Secretary be directed to mail a copy of same to the family of the deceased.

S. E. DE FRESE,
R. C. CONGDON,
JOHN PARKER,
} Committee.

(To be Continued.

Management & Commercial Methods.

TRAVELLING GAS EXHIBITION IN GERMANY.—The *Gas World* declares that the success of the gas display (Domestic Exhibition, Berlin, last March) was so decided that the German Gas Promotion Center organized a travelling exhibition to let the people in the various towns of Germany know what gas really can do. Two women demonstrators and one lecturess will accompany the show, which is to make its first appearance at Saarbrücken. Over a 100 days or about ½ year's work, have been arranged for in different places, and the applications for a visit are numerous. The exhibition carries about a movable, three-roomed house, a model workman's dwelling of two rooms, a model kitchen of a gentleman's house, several show windows and a large assortment of appliances. The German manufacturers have thrown themselves very heartily into the scheme, and the gas works and gasfitters in the localities have done the same. The stay in each place is from 5 to 14 days. The Gas Promotion Center pays carriage charges.

What with the work of the German Commercial men, and the British Commercial Gas Association with its Publicity Fund of over $60,000, the American Association will have plenty of work ahead to beat the world. It looks that the German method of weekly gas shows would prove to be most acceptable amongst the Company members, even though it does smack of the peripatetic order.

THE OFFICES AND SHOWROOM, MUNICIPAL GAS COMPANY, ROME, GA.—Everyone who knows Mr. George Ferrier whose acquirement of the properties of the Rome (Ga.) Municipal Gas Company, was notification that these would be put in first-class condition, knows that he never does things by halves. The named plant was, to say the least, not in the best possible condition at the time of his taking it over; but conditions and standing regarding it have all been changed. From an up-to-date generating plant the residents are getting a plentiful supply of evenly constituted artificial gas, and the users thereof when they come to pay their accounts, are visitors to a business place that is a credit to the city, a satisfaction to the customers, a sort of comfort to the Company's employees, and a satisfaction to the Corporation, in that Mr. Ferrier knows that equable treatment of his patrons insures him a good return for his labors. The accompanying illustrations show the exterior of his office home, which is situated right in the business heart of thriving Rome, and that part of the interior which is given over to a display of appliances the use of which helps to greatly modify the conditions under which housekeeping in the Roman district of the Cracker State is carried on.

(For illustrations see next page.)

Fig. 1.—Office and Showroom, Municipal Gas Company, Rome, Ga. Front View.

Fig. 2.—Office and Showroom, Municipal Gas Company, Rome, Ga. Interior.

Items of Interest
FROM VARIOUS LOCALITIES.

"A. S. B.," writing to the JOURNAL under date of the 11th inst., says, among other things: Following up the contract placed by the New York and Richmond Gas Company, for the paint necessary for covering its holder at Clifton, and having decided to cover its holder at West Brighton, gave the repeat order to the Atlas Paint Company, of New York and Nashville. He also notes that, among other interesting orders lately to hand, was one from the Consolidated Gas Company, of New York, for the paint required on its ammonia tanks at Astoria. This order followed tests that had been made by Mr. Underhill. In fact, "A. S. B." declares that, according to the "ad." in the JOURNAL by the Koppers' people anent their Koppers' oven, referring to the fact that "They will all come to it," so it will be with "Atlan" paint.

WRITE to Mr. Paul F. Reichhelm, of the American Gas Furnace Company, for a copy of its latest pamphlet-brochure respecting gas as a fuel in mechanical heating processes.

ON the 8th inst. Messrs. J. A. Slattery and W. A. Clader, of Philadelphia, and H. W. Darling, of Chicago, journeyed to Freeport, Ills., to formally take over the properties of the Freeport Gas Light and Coke Company, which are now numbered amongst the possessions of the Geist Corporation. The resignations of the former officers were accepted, and these gentlemen were chosen in their stead: Directors, Messrs. C. D. Knowlton and F. C. Weber, of Freeport; J. A. Slattery, W. A. Clader, C. H. Weak and H. C. Milliken, of Philadelphia; and H. W. Darling, of Chicago; President, C. D. Knowlton; Vice-President, W. A. Clader; Secretary and Treasurer, F. C. Weber.

"C. B.," writing from Bath, N. Y., under date of the 13th inst., notes that the Bath Gas and Electric Company has about completed the placing of 3 miles of additional gas mains. Supt. Frank Nollett is evidently going after business in a way that will keep the new water gas plant up to maximum.

MR. ROY SHACKLETTE and associates, of Detroit, have purchased a controlling interest in the Big Rapids (Mich.) Gas Company, and the gentleman named will devote himself to the development of the property. Mr. B. O. Tippy still retains a heavy interest in the corporation and will continue to be actively identified with it.

"MR. ALBERT M. BARNES, who, in the company of his estimable wife, has recently completed an extended trip through the North and West, returned home some days ago, to again take up actively the duties of Treasurer of the Cambridge (Mass.) Gas Light Company. On his arrival in the city a delegate from the Company's working forces—all grades and conditions, from high to low, were represented—informed him that his presence and that of his good lady were required in the meter rooms, which had been tastefully ornamented in a floral way. On their arrival they found 150 of the force waiting to receive them. The cheers were still re-echoing through the room as Mr. John F. Kennedy, foreman of works, stepped forward, and, in well-chosen words, asked Mrs. Barnes to accept a huge bunch of American beauties, and then presented on behalf of the men to the blushing pair a silver tea service daintily reposing on a splendidly decorated silver tray. The pieces were suitably inscribed. Mr. Barnes is not usually stumped over any happening, but this time his equanimity was not to scale. However, he managed to get through his thanks; but not so Mrs. Barnes. She did not have a word to say, although that the gift was *cosa grata* seemed rather well exemplified from the number of times that her features were hidden in the beauteous blooms. After the giving and receiving of the gifts, an informal reception was heartily enjoyed, for the successful bringing off of which a certain spry gentleman connected with the office force was very much in evidence.—B. B."

THE proprietors of the New Charlotte (Mich.) Gas Company are considering the good policy of extending the distributing system to Eaton Rapids, Mich., the scheme, of course, being dependent upon the franchise action of the authorities of Eaton and Eaton Rapids. Application for these rights has been made. The Company will, under the tentative plan so far arranged, put down a 3 inch, high pressure line, 16 miles in length, that being the distance between Charlotte and Eaton Rapids. The farmers along the pressure line will be allowed to hook up to it.

PRESIDENT ELLIS and Engineer Miller, of the Providence (R. I.) Gas Company, have assured the Riverside (a suburb of Providence) Improvement Society that the piping system necessary to supply gas to the residents of Riverside would be completed this fall, provided the necessary franchise privileges were granted prior to August 10th. It is also agreed that service pipes, not over 20 feet in length from the curbing, would be laid in free, and all those who installed a gas range in their premises could count on having the same put in service without any charge for piping.

THE contest for the right to supply gas in North Hempstead, L. I., which was carried on appeal from the decision of the local authorities to the Public Service Commission, New York, Second District, by the Westbury-Hicksville Gas Company, has been decided in favor of the Public Service Corporation, of Long Island. The Commissioners in deciding the difference report: "To supply said town (North Hempstead) and the inhabitants thereof with gas, it is essential there should be but one gas corporation engaged in said service, which gas corporation should be in a position to occupy all of the public highways in said town upon which there are residents who desire to use gas. The Public Service Corporation, of Long Island, has obtained franchises from the Town Superintendent of Highways, and also from the Board of Supervisors of the county, while the Westbury-Hicksville Gas Company has obtained only a franchise from the Town Superintendent of Highways to occupy the town highways, and the Board of Supervisors of the county has refused to grant this Company a franchise to occupy the county road."

"V. M. M.," incloses this note, dated the 12th inst.: "Last week the Oberlin (O.) Gas and Electric Company, which is in the hands of a receiver, was sold to the Light and Development Company, a holding corporation with headquarters in St. Louis, and which controls several public utility concerns. Depositing holders of first mortgage bonds of the Oberlin Company, on the 6th inst., were notified yesterday that they will receive their interest in default, and 40 per cent. of the principal as well forthwith, and will continue to have an interest in the property equivalent to 60 per cent. of the par value of their bonds. The first mortgage bondholders who did not deposit their bonds with the Citizens Savings and Trust Company, will not receive settlement on equal terms as will those who deposited." This looks a queer settlement, with the terms decidedly in favor of the parties who negotiated the deal; and the implied threat of punishment held out to the non-depositing creditors is somewhat on the ludicrous side. We imagine, however, the latter have small cause for grief, in so far as the pronunciamento noted is concerned since it is more than likely that the smallest non-assenter, in point of holdings, could, through the invocation of *supesedeas* proceedings, secure a much better award than the 60 per cent. sour fruit doled out to the assenters.

THE Hamilton (O.) *Journal* says that the property of the Hamilton (O.) Gas and Electric Company, including the Otto coke oven plant with its 100 ovens, the franchise rights and all other properties, worth probably $1,000,000, and appraised at $740,647.24 -is not that precise—was sold at auction the 9th inst., as per order of the court. There was only one bidder (Frank L. Perin), whose offering of $350,000 was the minimum specified for acceptance by the order of sale issued by Judge Hollister. Receiver Goodman was requested to report the bid to Judge Hollister, with a request that the plant be ordered sold at the bid, but this will not be done. Goodman, will surely report the sale, and allow the court to approve or reject the sale.

MR. F. LEWIS MARSHALL, formerly Manager of the Hampton-Phoebus and Fort Monroe Gas Corporation, which some time ago was purchased by the Newport News, Old Point (Va.) Railway and Electric Company, and which is also owned by the same parties, has been placed in charge of both plants.

THE Register of Deeds, Portland, Me., reports that, on the 3d inst., papers were filed noting the incorporating of the General Gas and Electric Company, to conduct a general power, lighting and railway business. It is capitalized in $20,000,000, but of that nothing was paid in. The executive list of the concern is: President, A. F. Jones Portland; Treasurer, A. A. Richards, Portland; Clerk, Jas. E. Manter, South Portland; Directors, A.F. Jones, B. M. Maxwell, Portland.

THE authorities of St. Paul, Min., have assented to the petition o the St. Paul Gas Light Company for permission to extend its mains to and through the outlying settlements or suburbs known as South St. Paul.

AT the annual meeting of the Mechanicville (N. Y.) Electric Light and Gas Company the officers elected were: President and Treasurer, Edwin Farrow; Vice-President. James Greenway; Secretary, M. J. Farrow. The Company also decided to alter its system from 133 cycles single-phase to 60 cycles, 3-phase.

THE Common Council of Hackettstown, N. J., held a special meeting some days ago, the particular matter for consideration being the Mayor's veto of the ordinance granting a 50-year franchise to and for the proposed new Hackettstown Gas Company. Our informant adds that the Council were all of one mind, in that they voted unanimously to adopt the ordinance by re-enacting it over the veto. The ordinance is now being advertised according to law, and the franchise has been passed on to the Public Utility Commission for approval. This secured, construction work will be commenced at once so that gas may be turned on before winter is at hand.

"OF course, the Malden Electric Company will not let you know anything about the result, so as a backer of the Malden-Melrose (Mass.) Gas Light Company's baseball team I will inform you. Some days ago the baseball teams representing the named divisions of the artificial lighting supplies of the district stated met on the athletic field of the Malden High School. When the ninth inning was at an end the scorer made this announcement: "Gas, 14; Electric, 4! And there you have it.—T. W. T."

THE following rate schedule (effective the first prox.) is announced by the proprietors of Atlanta (Ga.) Gas Light Company:

Quantity, Cubic Feet.	Per 1,000, Gross.	Per 1,000, Net.
First 10,000	$1.10	$1.00
Second "	1.00	0.90
Third "	0.90	0.80
Above 50,000	0.80	0.70

MR. H. A. ODELL has again been heard from; and, queerly too, the resurrection is made along the South Shore of Long Island, N. Y., the reappearance having been made despite his operations in 1910 respecting the South Shore Gas Company, of Babylon, L. I. He appeared before the authorities of Southhampton, as a representative of the Sag Harbor (L I.) Gas Company, and urged that the latter corporation be permitted to extend its mains from Sag Harbor to and through Bridgehampton and Watermill—this latter place boasts by-the-way of an old Dutch windmill erected there in 1664—to Southhampton. The first one sounded was Mr. James H. Pierson, President of the Southhampton Bank, who in turn consulted with his Trustees over the availability of the proposition. They opposed the project, and as three of the Trustees (Messrs. Thos. T. Corrigan, Willis D. Van Brunt—who is President of the Village Board—and H. P. Robbins) are also members of the Village Board, the affirmation of the plan looks unlikely. Meanwhile, we might remark, that the scheme would certainly be of much value to lower Long Island, if carried out by responsible men; but not by Mr. Odell.

THE Waynesboro (Pa.) Gas Company's main system has been overhauled. That the business of this well managed concern is growing beyond the hopes even of its promoters would seem proven in the fact that this overhauling included the replacing of several stretches of 2-inch mains by pipes 10 inches in diameter.

A CORPORATION known as the Frost Gas Company has applied to the authorities of Dunkirk, N. Y., for the right to lay gas mains through the streets of that city.

MANAGER A. A. LAUGHTON, of the Gardner (Mass.) Gas, Fuel and Light Company, has arranged it so that every employee of the concern will have, during the balance of this month (dating from the 18th inst.) and all of August a half holiday on Saturday, with full pay.

PUBLIC LIGHTING TABLE FOR JULY, 1912

[COMMUNICATED BY THE AMERICAN METER COMPANY.]

Day of Week.	MOONLIGHT SCHEDULE.		
	Date.	Light.	Extinguish.
Monday	1	8.00 P.M.	10.30 P.M.
Tuesday	2	8.00	11.00
Wednesday	3	8.00	11.20
Thursday	4	8.00	11.40
Friday	5	8.00	12.00
Saturday	6	8.00	12.20 A.M.
Sunday	7	8.00 L.Q.	12.50
Monday	8	8.00	1.10
Tuesday	9	8.00	1.40
Wednesday	10	8.00	3.40
Thursday	11	8.00	3.40
Friday	12	8.00	3.40
Saturday	13	8.00 N.M.	3.40
Sunday	14	8.00	3.40
Monday	15	8.00	3.40
Tuesday	16	8.00	3.40
Wednesday	17	8.00	3.40
Thursday	18	9.20	3.40
Friday	19	9.40	3.40
Saturday	20	10.00 F.Q.	3.40
Sunday	21	10.30	3.50
Monday	22	11.00	3.50
Tuesday	23	11.30	3.50
Wednesday	24	12.10 A.M.	3.50
Thursday	25	1.00	3.50
Friday	26	2.00	3.50
Saturday	27	No L.	No L.
Sunday	28	No L. F.M.	No L.
Monday	29	No L.	No L.
Tuesday	30	7.50 P.M.	9.30 P.M.
Wednesday	31	7.50	9.50

The Market for Gas Securities.

Consolidated managed to get above 146 during the week and then sold off to 145. It came in to-day (Friday) at 145¼ to 145½. There was some good buying on this gain, perhaps the greatest sales having been made between 145 and 146. The buying was through strong concerns, too.

Brooklyn Union is to all intent level with Consolidated, at 145½ to 146. The trading in this security was very light. Other shares reflect the fact that the gains in the past month or so are quite sure to be exceeded by those for the next 30 days or so.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JULY 22.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	145¼	145½
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	103	105
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	3,500,000	100	190	205
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	101	102½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	100	102
Standard	5,000,000	100	69	70
Preferred	5,000,000	100	93	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	145½	146
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	200,000	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¼	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,660,000	1,000	104	106½
Cincinnati Gas and Electric				
Co.	20,500,000	100	87	90
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	90½	91
Preferred	2,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	13,460,084	—		—
Mortgages, 5's	3,400,000	—		—
General Mortgage 4½	10,661,000	—		—
Con. Gas Co., Baltimore				
City, 4½	2,751,000	—		—
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	94	96
Bonds	75,000	—	—	100
Detroit City Gas Co.	6,580,000	—	—	50
Detroit Gas Co., 5's	881,000	1,000	75	80
" Prior Lien 5's	5,619,000	1,000	97	100½
Equitable Gas & Fuel Co.,				
Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	130	132
" Bonds, 5's	10,500,000	—	101	106
Indianapolis	2,000,000	—	—	38
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	91	95
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	99	102
Laclede Gas Co., St. Louis.	10,000,000	100	106	106⅜
Preferred	2,500,006	100	90	91⅛
Bonds	10,000,000	1,000	102¾	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	88¾	89
Preferred	25,000,000	100	96	97
Montreal Gas Co., Canada	2,000,000	100	216	220
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	182	190
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	115½	116¼
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
Pacific Gas and Electric Co.	15,500,000	—	64½	65½
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	96	98
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,800,000	200	420	425
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 16 to 18, 1912. Marlborough-Blenheim Hotel, Atlantic City, N. J. Officers: President, Ira C. Copley, Aurora, Ills. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting and Gas Show, Toronto, Aug. 26th to Sept. 7, 1912. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 1912. Officers: President, R. M. Searle, Rochester, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Gas Meters.—Monthly meetings. Chairman, Will W. Barnes; Commissioners, W. H. Pettes, I. W. Peffy; Secretary, H. Thurston Owens, 42 Pine street, New York City.

Guild of Gas Managers of New England.—Annual meeting, March, 1913. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 19th and 20th, 1913. Chicago, Ills. Officers: President, H. O. Channon, Quincy, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting, Niagara Falls, Canada, Sept. 16-19, 1912. Meetings of Sections, monthly. Pres't, V. R. Lansingh, New York City; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March, 1913, Indianapolis. Officers: President, Howard L. Olds, Indianapolis; Vice-President, Wm. Wallace, Lafayette; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, Burlington, Ia., May, 1913; Officers: President, C. W. Fair, Atlantic, Ia.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October 17-19. Manhattan, Kas. Officers: President, B. F. Eyer, Manhattan, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, September 4-6, 1912; Toronto, Canada. Officers: President, F. W. Blowers, Kalamazoo, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1913; Joplin, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and Gas Show, Dec. 2-5, 1912. Atlanta, Ga. Officers: President, C. L. Holman, St. Louis, Mo.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, Cleveland, O., May, 1913; Officers: President, M. B. Daly, Cleveland, O; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, ——— 1913. Boston. Officers: President, D. D. Barnum, Worcester, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Summer Meeting, Sept. 21, Atlantic City, N. J.—President, William H. Pettes, Newark, N. J.; Secretary-Treasurer, Arthur H. Osborn Belmar, N. J.

Ohio Gas Association.—Annual meeting, February ———, 1913, Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Deming, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, May, 1913. President, Noel R. Gascho, Alva, Okla.; Secretary, H. V. Bozell, Norman, Okla.

Pacific Coast Gas Association.—Annual meeting, San Diego, Cal., September 17, 18, 19, 1912. Officers: President, W. Baurhyte, Los Angeles, Cal.; Vice President, Henry E. Adams, Stockton, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, York, Pa., April, 1913; Officers, President, H. H. Ganser, Norristown, Pa.; Secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 13, 1912; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city

Southern Gas Association.—Annual meeting, April ——— 1913, Charlotte, N. C. Officers: President, C. E. White, Montgomery, Ala.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April———1913, Galveston, Tex. Officers: President, F. M. Lege, Jr Dallas, Tex.; Secretary, H. S. Cooper, Galveston, Tex.

Wisconsin Gas Association.—Annual meeting, May ——— 1913, Milwaukee, Wis. Officers: President, I. F. Wortendyke, Janesville, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.